REPORT

ON

CHOLERA IN SOUTHERN INDIA

FOR THE YEAR 1869;

WITH MAP ILLUSTRATIVE OF THE DISEASE.

BY

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CONTENTS.

Para.		Page.
	Introduction...	1
2.	The Vital Statistics of Territories abutting on the Madras Presidency, necessary for the construction of a complete cholera map for Southern India ...	ib.
3.	Central Provinces and Burmah not included in present map...	ib.
4.	Great immunity from cholera of Southern India in 1868	ib.
6.	Invasion of Hyderabad territory in 1868...	2
7.	Cholera not endemic in city of Hyderabad...	ib.
8.	Outbreak of cholera in Secunderabad, 14th November 1868...	ib.
11.	History of first case at Secunderabad	3
14.	Two cases at Chudderghaut, 15th November	ib.
15.	Her Majesty's 21st Fusiliers, 2nd Battalion, attacked by cholera on 16th Nov. ...	4
17.	Epidemic in Secunderabad Bazaars	ib.
18.	Partially exempted locality in the epidemic field	ib.
19.	Remarkable exemption of resident military	ib.
20.	Epidemic outbreak at Residency on 23rd November	5
21.	Nullagoontah in Secunderabad presumed to be the real focus of the disease	ib.
22.	Cholera in the city of Hyderabad, 24th November...	ib.
23.	Extension of the epidemic to the southward	ib.
25.	Along the Kurnool road...	6
26.	To Lingasoogoor in the Raichore Doab	ib.
27.	Invasion of British Territory first occurred in the Kurnool District	ib.
28.	History of extension of cholera in the Kurnool District	ib.
,,	Cholera at Noonipilly in Kurnool on 4th January 1869	7
29.	Attack of 19th Regiment N. I. on 7th January	ib.
30.	Town of Kurnool invaded on 27th January	9
,,	Failure of quarantine measures ..	ib.
32.	Reproduction of cholera in Kurnool in June and July	ib.
33.	Extension of cholera to Cuddapah District...	ib.
34.	*Bellary District*	10
35.	Municipalities in Bellary District	ib.
36.	Bellary Town and Cantonment...	ib.
,,	Failure of quarantine ...	ib.
37.	Affection of European Troops ..	11
38.	Comparative immunity of the Municipality of Bellary	ib.
39.	*Nellore District*	ib.
,,	Nellore District under influence of both monsoons ..	ib.
40.	*North Arcot District* ...	ib.
,,	Affection of pilgrims at Triputty...	ib.
,,	Railway travellers from Triputty affecting Salem, Coimbatore, Conjeveram, and Bangalore ...	12
41.	*Madras Town and District*	ib.
42.	Incidence of epidemic slighter, but falling on some localities as in 1860 and 1866...	ib.
43.	Measures for the limitation of cholera undertaken by Government	ib.
44.	Exemptions in Madras Town	ib.

Para.		Page.
44.	Her Majesty's 45th Regiment attacked, 7th September	12
45.	Cholera in Her Majesty's 45th, following arrival of Details from Burmah and overcrowding of Barracks	13
47.	Removal of Troops from overcrowded Barracks to Palaveram	ib.
„	Persistence of cholera in the Detachment...	ib.
48.	Communication of cholera to villages *en route* to Palaveram	ib.
49.	St. Thomas' Mount not affected by the Detachment...	ib.
51.	Cholera in Palaveram Bazaar on the 9th September...	14
„	Escape of European community at Palaveram	ib.
„	Sanitary condition of Palaveram Bazaar...	ib.
53.	Immunity from cholera, shared by some other Military Stations in neighbourhood.	15
54.	Extension of cholera to Chingleput	ib.
55.	Monsoon influences on cholera in Southern India	ib.
56.	*South Arcot District*	ib.
„	Cuddalore	16
57.	No general prevalence of cholera in Salem, Coimbatore, Madura, Tinnevelly, Malabar, or Canara	ib.
59.	*Tanjore District*	ib.
60.	Cholera as endemic in Tanjore	ib.
61.	Municipalities in Tanjore	17
62.	*Trichinopoly District*	ib.
63.	Cholera in the Cauvery Valley, Moosery Talook, in October 1869	ib.
„	Town of Trichinopoly reached only on the 16th December	ib.
„	Influence of the Sreerungum festival	ib.
„	Immunity of Central Jail	ib.
„	Large rainfall in N. E. monsoon	ib.
64.	*Salem District*, importation by Railway	ib.
„	Municipal improvements in town of Salem...	18
65.	*Coimbatore District*	ib.
„	Cholera brought to Railway station by travellers from Triputty	ib.
67.	First case, the child of a Railway Official, 21st September	ib.
„	Outbreak confined chiefly to districts round the station	ib.
68.	Extension to Coimbatore town, and dying out of epidemic	ib.
„	Meteorological condition at Coimbatore	ib.
69.	*Malabar*	ib.
70.	Mortality of fish at sea coincident with cholera along the Western Coast ...	19
71.	*Northern Coast Districts*...	ib.
72.	Vizagapatam	ib.
73.	Ganjam	ib.

APPENDICES.

I.	Extract of Report on a cholera epidemic at Secunderabad during 1868-69, by Dr. E. Balfour, Deputy Inspector-General, Indian Medical Department ...	23
II.	Government Meteorological Register kept at Kurnool during the month of January 1869	33
III.	Report on the outbreak of cholera in the 45th Regiment at Fort Saint George, during the month of September 1869, by Dr. Finnemore, Surgeon, 45th Regiment...	37

Para.		Page.
IV.	Cholera Statistics of European Troops at Palaveram from 1848 to 1869 ...	40
„	Cholera Statistics of Native Troops at Palaveram from 1826 to 1869	41
V.	Table showing the total deaths and mortality from cholera in the several Districts and Municipalities in the Madras Presidency during 1869	42
„	Table showing the total deaths and mortality from cholera in the several Jails of the Madras Presidency during 1869	43
„	Table showing the total deaths and mortality from cholera among European Troops at each Station of the Madras Presidency during the year 1869 ...	44
„	Table showing the total deaths and mortality from cholera among the Native Troops at each Station of the Madras Presidency during the year 1869 ...	45
VI.	Report on an epidemic of cholera at Thayetmyoo, British Burmah, in 1869, especially with reference to its appearance in the Head Quarters and Right Wing of Her Majesty's 76th Regiment, by Surgeon W. A. Thomson, B.M.S...	46

REPORT

ON

CHOLERA IN SOUTHERN INDIA,

FOR THE YEAR 1869,

WITH MAPS ILLUSTRATIVE OF THE DISEASE.

Introductory.

In compliance with the expressed desire of the Right Honorable the Secretary of State in Despatch No. 7 of the 16th September 1868, the following remarks have been drawn up, illustrating the diffusion of cholera in Southern India, and in explanation of the cholera map accompanying this report. The more detailed instructions for the investigation of cholera, drawn up by the Army Sanitary Commission and forwarded to India with the Despatch No. 10 of 23rd April 1869, did not arrive in time for general or systematic adoption during the past year; but it is believed that the heads of the British and Indian Medical Departments have directed the adoption of the Registers and of the several heads of inquiry laid down by the Commission, for future years.

The vital statistics of territories abutting on the Madras Presidency necessary for the construction of a complete cholera map for Southern India.

2. In the preparation of a cholera map which shall represent the progress of that disease in Southern India, it is obvious that detailed information in regard to the Native States of Travancore, Mysore, and Hyderabad—territories which fit in with various districts of the Madras Presidency,—are wanting to give completeness to the map. Information has been sought for, as regards the prevalence of cholera in these States in 1869, and has been incorporated, so far as available, in the accompanying map. In future years, with the cordial assistance of the several administrations concerned, it will be possible to exhibit much more clearly the progress of cholera in foreign States abutting on the territories under the Madras Government.

Central Provinces and Burmah not included in present map.

3. The Madras Army occupies certain stations in the Central Provinces and British Burmah; but as these provinces have each a Sanitary Officer under the local administration, whose duty it is to prepare cholera maps of their respective provinces, it is not intended to include those territories in the Madras cholera map* Such notice as may be necessary of cholera in the Military stations will alone be given.

Great immunity from cholera of Southern India in 1868.

4. The year 1868 was one noticeable for almost complete exemption of the Madras Presidency from epidemic cholera. In three districts only, *viz.*, Tanjore, Trichinopoly, and Salem, were there any deaths from this disease in such numbers as to attract any

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* The map has been preparod according to Dr. Goodeve's suggestions, but the Stational Diagrams make it very bulky. In future years a better form of map will be used.

attention. The total cholera mortality of the year was 8,023, and of these 5,780 occurred in the three districts specified. The ratio of cholera deaths for the whole population of the Presidency was only 3 to 10,000 of the population. At the beginning of 1869, the southern districts were, excepting Tanjore, nearly free of cholera.

5. But although the Madras Presidency had suffered but little from cholera in 1868, the same immunity had not been enjoyed by the Central Provinces and Hyderabad. Along the northern and north-western parts of Hyderabad and Berar, cholera prevailed severely throughout the months of July, August, September, and October, but it did not get so far south as Secunderabad and Hyderabad until November 1868.

Invasion of Hyderabad territory in 1868.

6. A clear understanding of the circumstances of the invasion of Hyderabad from the north appears to be essential to a comprehension of the subsequent extension of the epidemic in a southerly direction towards the Madras districts abutting on Hyderabad territory, and in which districts the progress of cholera comes properly to be investigated for the year under consideration. With this object the special report of Deputy Inspector-General Balfour on the introduction of cholera into Secunderabad in November 1868 comes first for consideration.

Cholera not endemic in city of Hyderabad.

7. It is necessary to state here that the large Military Cantonment of Secunderabad and the populous city of Hyderabad, had been ascertained to be quite free of cholera from the month of April 1867, until the out-break which occurred in November 1868. This fact would seem to be conclusive on the point that cholera is not an endemic of the locality. There was a clear interval of more than eighteen months of absolute freedom. Cholera, it has been observed, has always a tendency to linger for weeks or months in the Secunderabad bazaars; so much was this the case in the two years ending April 1867, that Dr. Balfour expressed an opinion, which he still holds, that the disease was an endemic of the locality.

Outbreak in Secunderabad, 14th November 1868.

8. Up to the 13th November 1868 no case of cholera had been reported nearer to Secunderabad, than Mominabad, Ganga Khair, Hingolee, and the Woon Taluq, localities all from 160 to 200 miles distant. But in the latter locality it was known to be prevailing late in the month of October. The absence of any systematic registration or report of deaths in the Hyderabad territories, renders this part of the inquiry less satisfactory than could be desired.

9. On the 13th November an annual religious festival was going on at Bolarum, one of the stations of the Hyderabad Contingent, and only two miles north of the new barracks at Trimulgherry. The temple is situated about 1½ mile to the south of Bolarum village, but adjoins the Military Cantonment. Deputy Inspector-General Balfour had visited the locality on the 27th October and found it quite clean. The festival was attended by some thousands of persons. It lasted for four days, and the visitors though chiefly from Secunderabad and Hyderabad, came many of them from long distances.

10. The first day of the feast fell on the 13th November 1868, and on the evening of that day the first case of cholera occurred. The man, a bullock-driver and resident of Secunderabad bazaar, was taken ill with all the symptoms of cholera at the feast, and was brought back to the Secunderabad bazaar to die.

History of first case at Secunderabad.

11. The following is an account of the case as taken by Dr. Balfour from the man's employer :—

"Rungiah, a comitee Baniya, lives in the 12th Regiment Lines, near the house of Jungum Najiah. Wife and children of deponent were driven in his own carriage to Bolarum temple on the pilgrimage day (13th). The driver was Veerapah, a native of Kurnool. He had been my servant for only four or five days. He came from Kurnool about two months ago, having been there from this for stones. Wife and children went from this about 3 or 4 o'clock in the afternoon. Soon after arriving at Bolarum, Veerapah had two motions, he was then put inside with the family, and the carriage was driven home by my brother. The carriage returned about 2 A.M., (14th November). I saw him on his return. He had been vomiting and purging on the road, and was so on his return, and continued so till he died at 2 P. M. (14th). He died in the cart-shed at Macleod Goondah."

12. It may be said with regard to the particulars of this first known case that the evidence of importation from the feast in question is remarkably weak. There is nothing to show that the man eat or drank anything at the fair, or that he had any connection with strangers who might have imported cholera. The only proven fact is that the man went to the fair, and that he there immediately, or very soon after arrival, sickened of cholera. If he took the disease at the fair, the absorption and development of the poison in his body must have been unusually rapid, for if the evidence is to be relied on, he had diarrhœa within an hour after arrival at the fair. From the rapid spread of cholera in the Secunderabad bazaar it is not improbable that travellers may have introduced the disease directly into the bazaar a day or two before the fair, and that the sickening of the first case at the fair was a mere coincidence; but there is no direct evidence that the disease was brought into the bazaar by strangers.

13. It would seem however most probable that the theory of direct importation into Secunderabad is the only one in acccordance with the subsequent events. Thus at 4 P.M., on the 14th November, the day on which the man "Veerapah" died at 2 P.M., the Cantonment Magistrate of Secunderabad reported four attacks and two deaths. Now if these two men died before 4 o'clock, on the 14th, it is clear that they must have been ill for some hours previous. These cases all occurred in the Nullagoontah Division of the town where the man Veerapah had died and they must have been ill probably for some hours before his death. Deputy Inspector General Dr. Balfour visiting the locality the next morning (15th) found several persons under the influence of the cholera epidemic.

Two cases at Chudderghaut, 15th Nov.

14. The only corroborative evidence with reference to the origin of the outbreak in the Bolarum feast is, that on the 15th November, two persons, a man and woman, who had returned from Bolarum temple on the 14th, were seized with cholera at Chudderghat, about 5 miles south of Secunderabad bazaar. Although they had been at the temple, they must have passed through the Secunderabad bazaar, on the 14th where, as will be seen above, cholera was rapidly extending. These two persons, it is noted, had been drinking freely at the fair. (According to Deputy Inspector General Balfour the excessive consumption of arrack is a noticeable feature of the fair in question.) The evidence that they got cholera at the fair is by no means conclusive.

15. Another fact remains to be noted with reference to this first outbreak of cholera.

Her Majesty's 2-21st Fusiliers left Trimulgherry for Madras on the early morning of 14th November. The Regiment halted at "Boorham Saibs'' Doorgah, a place about 10 miles on the south road, until the morning of the 16th. During this interval there was constant communication between the camp and the Secunderabad bazaar. It is averred also that many men of the 21st attended the "feast" at Bolarum on the 13th, but whether the men subsequently attacked by cholera had done so, could not be ascertained. Soldiers of the Regiment were seen in the Secunderabad bazaar on the afternoon of the 14th, and according to Dr. Marlow, Deputy Inspector General British, Medical Service, on the 15th too.

Her Majesty's 21st Fusiliers, 2nd Battalion, attacked by Cholera on 16th November.

16. On the morning of the 16th November (2 A. M.,) as the Regiment was about to move camp for the next station, Shumshabad, two bad cases of cholera were reported. On arriving at Shumshabad another man reported sick with choleraic diarrhœa. A fourth case occurred next day (17th) at Palmakhal, and from this date the Regiment pursued its march without any further manifestation of cholera. The specific influence necessary for the propagation of the epidemic had been left behind. The Regiment proceeded to Madras *via* Kurnool.

17. Returning again to Secunderabad town, we find the disease continuing in the locality where it broke out (Nullagoontah) and attacking ninety persons, of whom fifty-five died, in the first fourteen days. The sanitary condition of this special locality was bad, but not worse than some other places which suffered less. In a former epidemic in 1866 it had been visited more lightly than many other parts of the town.

Epidemic in Secunderabad bazaars.

18. Close by this epidemic locality is "James' bazaar," a wide street of shops to which there is great resort, and through which the high road to Hyderabad and the British Residency runs, many thousands of persons passing daily to and fro; but throughout the first out-burst of the epidemic, which lasted up to February 1869, only a single case was reported in this street. In the epidemic as it affected Secunderabad there were 217 attacks and 128 deaths reported up to the date of Dr. Balfours special report. The disease re-appeared in June, July, August and September 1869, and the total number of deaths in the Secunderabad bazaars was 512.

Partially exempted locality in the epidemic field.

19. In Dr. Bryden's report on epidemic cholera in Bengal, great stress is laid on the statistics of European and Native troops, as indexing the progress of cholera in the country.

Now as regards the virulent epidemic of 1868 which committed great havoc in all the surrounding country, it may be mentioned that the European and Native Troops of the united Cantonments of Trimulgherry and Secunderabad had almost a complete immunity. Two Companies of Madras Sappers, which marched up from Bangalore, and arrived during the height of the epidemic in the Secunderabad bazaar, were subsequently attacked; but the resident troops, European and Native had, with one single

Remarkable exemption of resident military.

exception, no cholera. In the re-appearance of cholera in the monsoon season, twelve cases and four deaths occurred amongst the European troops. It is obvious that the presence or absence of cholera amongst troops or jails can give no safe data for judging of the force of the epidemic on the native population. Nothing but a general registration of mortality can exhibit the true nature or progress of an epidemic. A cholera map of Hyderabad prepared only from military returns, would have shown in 1868, a very light affliction, whereas, in truth, a very great portion of the territory was severely visited.

Epidemic out break at Residency on 23rd November.

20. The cases of the two persons alluded to in paragraph 12, as having returned to Chudderghaut on the 14th November, and who were attacked on the 15th were followed by a lull, and no more persons in that locality appear to have suffered until the 23rd November, when eleven persons affected with cholera were brought under the observation of Dr. Wyndowe, the Residency Surgeon. Dr. Wyndowe notes in his report of these people "the whole of the eleven cases attacked on the 23rd, and twelve out of thirteen of those attacked on the 24th, occurred amongst the caste of Marwarri people, dwelling in the portion of the Hashmat Gunj bazaar, most of whom had just returned from the Secunderabad bazaar where they had been present at a feast given by a wealthy sowcar who lived near Nullagoontah, where cholera was prevailing." The total cases reported at Chudderghaut, was 135, and deaths fifty-eight. The population yielding these cases is said to be about 25,000.

Nullagoontah in Secunderabad presumed to be the real focus of the disease.

21. Before tracing the history of the cholera of 1868 any further, it may here be remarked that the weight of evidence is in favor of *Nullagoontah* in Secunderabad having been the real focus from whence the disease extended.

The cantonment and station of Bolarum suffered very little, though the villages around were severely visited. The two cases in Chudderghaut on the 15th, were apparently insufficient to affect others. It was not until a body of men had proceeded to the Secunderabad bazaar, and feasted in a choleraic locality, that the infecting power of the epidemic became sufficiently developed. The proof of importation, as recorded by Dr. Wyndowe, is as complete as any evidence of this kind can possibly be.

City of Hyderabad, 24th November.

22. The cholera which had only begun to be epidemic at Chudderghaut on the 23rd November reached the opposite bank of the Moosy river, and entered the walled city of Hyderabad on the 24th. It spread very rapidly, and up to the 2nd day of January 1869, had caused 1,656 deaths. The epidemic did not finally die out, until some months later. It appears to have revived in the S. W. monsoon months, and the total mortality recorded was 4,987.

Extension of the epidemic to the southward.

23. The evidence of the southward extension of the epidemic from Hyderabad, at the end of 1868, is, (owing to the difficulty of obtaining death returns from the officials of that country,) not so complete as might be desired. Specific information, in regard to the geographical spread has been asked for, from the Hyderabad authorities, but is not forthcoming. There is evidence that cholera prevailed in the village of Jeddacherlah on the Kurnool road in November and December, and in the Raichore Doab, but

it cannot be traced continuously into the Kurnool district, to the point of its first appearance amongst British subjects. Meanwhile the slender thread of facts available must be utilized.

24. It is in evidence that the Nizam's troops at their Cantonment of Gosha Mahal, a few miles to the south-west of Hyderabad city, were attacked by cholera a few days after the appearance of cholera in the city.

Along the Kurnool road.

25. A Jemedar's escort party which had been sent out from Secunderabad on the southern road towards Kurnool to meet about 180 carts containing ordnance stores, and which escort returned to Secunderabad on the 23rd December, reported the existence of cholera in the villages passed on the way down, but on the return of the party, (from the 13th to 23rd December,) the village authorities reported that it had ceased in the affected villages. The names of the villages are not given by Dr. Balfour. This party did not suffer from cholera.

To Lingasoogoor in the Raichore Doab.

26. The 5th Infantry Hyderabad Contingent moved out from Bolarum on the 30th November *en route* for Lingasoogoor to the south-west, notwithstanding that Deputy Inspector General Balfour had remarked with reference to the contemplated movement of this and another Corps, " I think it is almost impossible for these Corps to move hence at present without carrying cholera with them, introduced by the carriage and coolies."

The first case in the 5th Infantry, Hyderabad Contingent, occurred on the day of moving out, and cholera continued to attack the Corps until the 21st December, during which time there were seventy-two attacks and thirty-two deaths. Lingasoogoor is in the Raichore Doab, and there is evidence that the epidemic was fixed in this locality for some time. The hospital assistant in charge of the dispensary at Hospett, a town in the Bellary district a few miles to the south of the Toomboodra, reports that in the month of May 1869, cholera was brought into the town by pilgrims from Hooloogee or Hoosoor, places in the Raichore Doab, and in the territories of His Highness the Nizam.

Invasion of British Territory first occurred in the Kurnool District.

27. But the first introduction of cholera into British Territory does not appear to have followed the south western route, but a course almost due south, along the high road from Hyderabad city, crossing the Kistna valley, below the confluence of that river with the Toomboodra. Cholera we have seen, prevailed on the Hyderabad portion of this route about the middle of December. For want of the means of tracing its progress southwards, we do not again hear of it until the 4th January 1869 when, in a village on the right bank of the river and distant some forty miles from the river, we for the first time, are enabled to track its course in the Kurnool district.

History of extension of Cholera in the Kurnool District.

28. The circumstances in connection with this outbreak, happen to have been accurately noted, and the history therefore becomes all the more valuable for record. They were as follows :— The village of Noonipilly is a small hamlet or dependency of the town of Nundial, which town is on the high road between Hyderabad and the railway station of Cuddapah on the N. W. line, and is besides the centre of some local traffic. On the 3rd of January 1869, the head quarters and wing of

the 19th Regiment Native Infantry, in marching from Samulcottah in the Godavery District to Kurnool, crossed this high road at a right angle; and encamped near to the small hamlet aforesaid. Up to this date the route of the corps had been quite healthy. The other wing of the corps had traversed exactly the same route a fortnight before, had encamped on the same spot, and had arrived safe in Kurnool without any sickness. The districts from which the Regiment had come (Godavery and Kistnah) were absolutly free of cholera at, and after, this period. On the morning of the 4th January, the officers and men of the 19th Regiment pursued their way towards Kurnool in ignorance that any thing was wrong with the health of the place they had halted at. On that very same day four cases of cholera occurred in the village. The villagers, naturally enough with their limited knowledge of the facts, believed that the Regiment had brought the cholera to them. They knew that they had been healthy up to the date of the arrival of the corps, and that sickness had followed the arrival, and they did, as persons often do under such circumstances, look upon the arrival of the Regiment and the outbreak of cholera as cause and effect, but that this was not the right explanation will be evident from the context.

Cholera at Noonipilly in Kurnool on 4th January 1869.

29. The 19th Regiment Native Infantry, moved on four marches nearer the end of their journey, and having on the 7th January arrived close upon Kurnool, the Commandant and Medical Officer were astonished to learn that the corps had been reported to the civil authorities, as having left cholera at Noonipilly *Up to this time* (7th January) *the camp and followers of the* 19*th Regiment Native Infantry*, had been entirely free of cholera. As a precautionary measure it was thought best that the Regiment should not move into Kurnool, but encamp for a few days in the neighbourhood. On the evening of the 7th January the first case of cholera appeared in the Regiment, and no other case occurred until the 12th. From the 17th the cases increased in frequency until the 27th when the epidemic declined. The attack of the wing of the 19th lasted for 29 days, and during this time the corps was kept moving about on the high plateau of ground to the south east of Kurnool. During this time, many of the villages in the neighbourhood of the camp became affected. Particulars of these, and of the route taken by the Regiment in its shiftings of camp, are given in the annexed table and sketch map of the locality drawn up by Surgeon Andrews, Civil Surgeon of Kurnool.

Attack of 19th Regiment Native Infantry on 7th January.

Cholera Return.

Name of village.		Population.	Number attacked.	Number died.	Date of first attack	Date of last case.	Where did the infection come from.	In what direction did the epidemic proceed.	Remarks.
					1869.	1869.			
Ramulkota Taluk.	Yeldurti	2,213	60	21	15th Jan.	28th Jan.	Uncertain. Some say from merchants who supplied grain to 19th Regiment Native Infantry at Nurnur and others from wandering beggars.	The epidemic proceeded to the village of Narlapur which is one mile to the north of Yeldurti and there stopped.	There was one case at Uppalpad, contracted apparently at Kurnool.
	Narlapuram...	768	3	1	25th do.	30th do.			
Nandikothur Taluk.	Pasupula......	438	28	11	10th do.	29th do.	The epidemic came from the 19th Regiment when it halted near these villages.	Kurnool.	The epidemic has since totally disappeared.
	Nutanapalli...	152	1	1	26th do.	30th do.			
	Rudraveram..	873	7	2	26th do.	28th do.			
Nandikothur Taluk.	Palamarri ...	357	5	2	26th do.	31st do.	The inhabitants of these villages who supplied the 19th Regiment at some stations, returned to their villages after which the disease made its appearance among them.	Did not proceed further.	
	Nagaluti.......	445	1	1	16th do.	20th do.			
	Nandikothur.	1,972	1	1	29th do.	29th do.			
Noonipilly	Taluk Nandial...	501	20	8	4th do.	21st do.	Not known.	Not known.	In Noonipilly no cholera existed prior to the arrival of the 19th Regiment. They left the village on the 3rd January 1869. They had no cholera among them at the time, but it appeared among them a few days later. It is impossible to say whether they infected the village, or whether the village was the cause of the cholera beginning in the Regiment.
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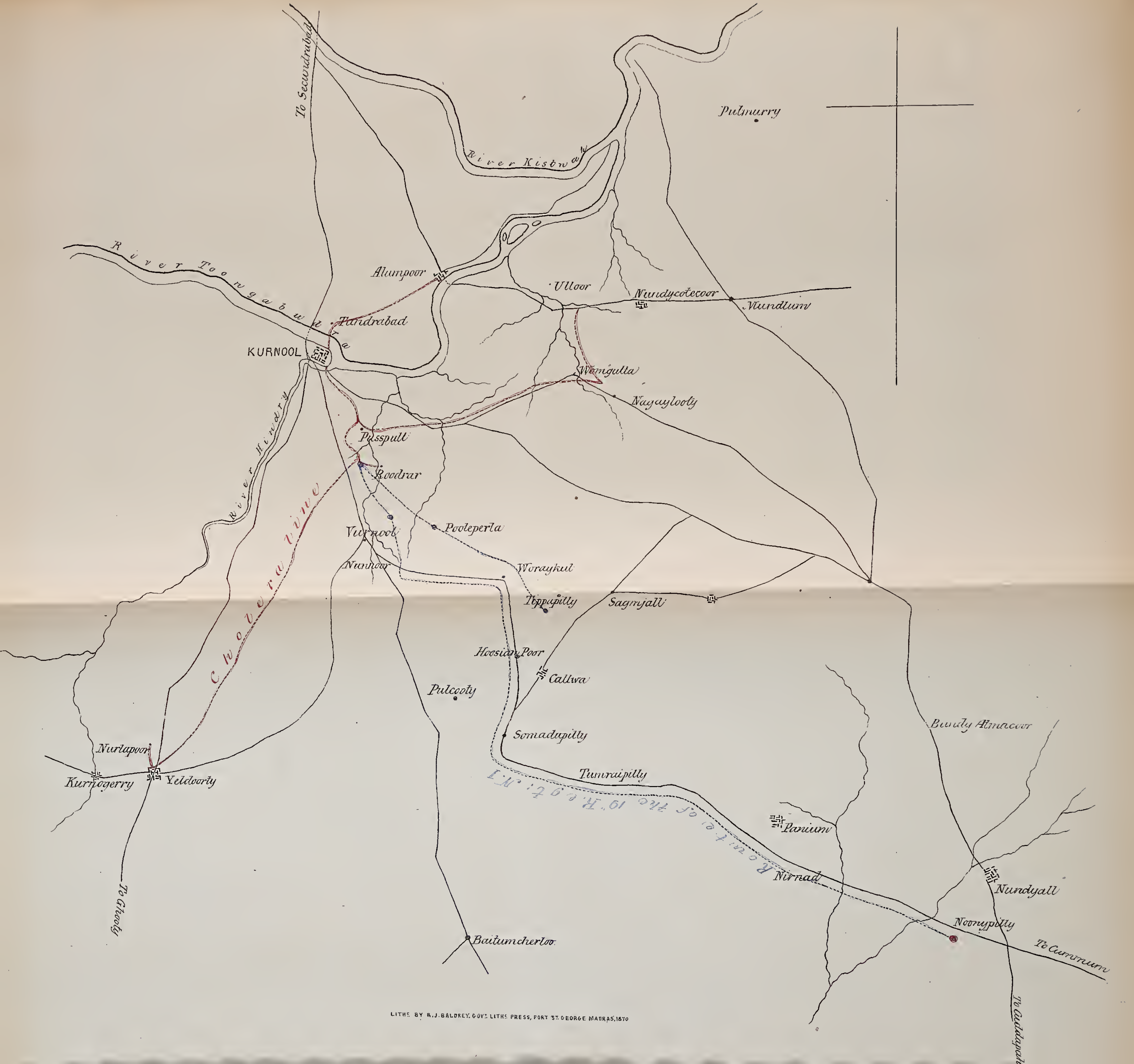


LITHD. BY R. J. BALDREY, GOVT. LITHO. PRESS, FORT ST. GEORGE MADRAS, 1870

Town of Kurnool invaded on 27th January,

Failure of quarantine measures.

30. The introduction of the disease into the town of Kurnool did not apparently take place until the 27th January 1869. The Wing of the 19th Regiment had been kept outside, and efforts were made to establish a sanitary cordon around the town, but unsuccessfully.

Dr. Andrews, the Civil Surgeon, records that "an inhabitant of the town went to Pasugull (a village 5 miles distant from Kurnool, which had been apparently infected from the camp of the 19th Regiment) to buy fodder for his cattle, and on the night of his return, January 27th, was seized with cholera. On the 28th a case occurred in the District jail, the man had communication with friends who had lately arrived from the road upon which the infected troops had been travelling. How they got into the town, or whether they were kept in quarantine, I have not been able to ascertain."

31. Quarantine, as might have been expected under the imperfect system of its application, failed to keep the disease out of the town of Kurnool. Still it is worthy of remark that it took *twenty* days, from the time of the first case in the Regiment, for cholera to reach the town, the villages all around being first affected.

32. Cholera once admitted into Kurnool attacked the prisoners in jail, the Sepoys of the right wing of the 19th Regiment in the lines, and the Civil inhabitants. It lingered about the town until the middle of April with one or two lulls. On the 5th March a festival occurred at Allumpoor a town on the left bank of the Toomboodra, twelve miles from Kurnool. This was attended by a number of persons from Kurnool, and three days afterwards cholera broke out in Allumpoor and spread to several villages. As the hot weather increased cholera disappeared, but it burst into new life with the monsoon rains of June and July, prevailing not only in the town but in most parts of the western division of the district, including the places attacked in January, February and March, and finally dying out in September. It is to be noted however that the eastern or Cumbum Division of the Kurnool District was quite free of cholera throughout the year. The total number of cholera deaths in the town of Kurnool was 323. Of these 181 occurred during the 1st outbreak in January, February, March and April, and 142 in June and July. The disease attacked the town with much greater virulence than it did the district, the cholera, mortality of the former being in the proportion of 13·5 per mille of population, while in the latter it was only 3·6 per mille. It must be remembered however that the eastern division of the District was wholly exempted, and that in the villages actually affected the mortality was high. The Sanitary and Medical arrangements for the town during the epidemic appear to have been carefully arranged, but in consonance with all its previous experience of epidemics, cholera clung persistently to the locality for many months. The meteorological record made at Kurnool in the month of January 1869 will be found in the Appendix (II). It affords no support to the theory that the N. E. monsoon winds wafted the disease southward from Hyderabad.

Re-production of cholera in Kurnool in June and July.

Eastern division of district exempted.

33. The cholera which has thus been traced into the Kurnool District in January 1869 was apparently carried on by the same means to the south eastern Districts of Cuddapah and North Arcot.

Extension of cholera to Cuddapah District.

The direct proof however of human agency in distributing cholera to these districts is not attainable. Owing to the absence of certain meteorological conditions, it appears to have been repressed as an epidemic. A few cases only are reported from January to May; and it was only in June, concurrently with the change from intense heat and dryness, to the cool and moist atmosphere of the south-west monsoon, that cholera began to make its presence felt in the Cuddapah district. Seven deaths occurred in May, ninety-six in June, and seven hundred and fifteen in July, from which date the monthly mortality began to decline.

In the Municipality of Cuddapah (Population 14,685) twenty-two deaths, were registered in July and August. The proportion being at the rate of 1·4 per mille of population.

Bellary District.

34. The District of Bellary to the south of Kurnool was invaded in March from the Kurnool side, and as we have already seen, to the westward in May, from the Raichore Doab. There appears to have been but little spread of cholera before the month of May in the Bellary district, but after the fall of the early rains it extended itself very rapidly, attaining its maximum of prevalence in June and July. By the end of October cholera had entirely disappeared from the district. The great Humpy festival in April passed off without any cholera, the western portion of the district in which Humpy lies, at that time being almost entirely free of it.

Municipalities in Bellary District.

35. It may be noted that the Municipalities in this district along the line of north-west Railway suffered very severely in the epidemic.

Adoni.—At Adoni where Railway works were in progress cholera broke out on the 4th June, at the end of a very hot season. It raged with great violence through June and July, and is said to have ceased on the setting in of heavy rain. 178 deaths out of a population of 17,828, or 10 per mille, were caused by cholera.

Ghooty.—At Ghooty cholera began to prevail as early as April along the Railway works, and at the Railway station, and within a radius of 30 miles. It did not reach the Municipal town until 30th June, though only two miles distance from the railway station. The Medical Officer of the station records that the epidemic seemed to progress chiefly against prevailing winds. Malarious fevers were also very prevalent in this station. The rate of cholera deaths to population at Ghooty was 5·1 per mille.

Anantapoor.—In the Municipality of Anantapoor there was but a slight prevalence of cholera from June to September. The cholera death rate being only 1·8 per mille.

Bellary town and Cantonment.

Failure of Quarantine.

36. Along the line of Railway in process of construction from Ghooty to Bellary, cholera found its way into the Cowle bazaar of the Bellary station in May. Great attention was paid by the Military authorities to the condition of the Cantonments, and endeavours were made to establish a quarantine of the troops. As usual in such cases success was not attained. In the third week in June, three cases occurred in the lines of the 16th Regiment Native Infantry. It would seem that the sufferers belonged to the family of a Sepoy of the Regiment, who had just returned from furlough, and managed to evade the picquet stations

which had been organized to prevent the entrance of native travellers into the cantonment.

Affection of European Troops.

37. On the 19th June, the bazaar having been for several days reported free of cholera and the restrictions as to the entrance of troops into it relaxed, two men, one woman, and eight children of H. M.'s 3rd Battalion, 60th Rifles were taken to hospital suffering from choleraic diarrhœa, and within half an hour a man was admitted with cholera in the algide stage. All these cases ultimately recovered.

Comparative immunity of the Municipality of Bellary.

38. The Municipality of Bellary has a population of 37,015 ; and notwithstanding the severity of the disease in other localities of the district, only twenty-one deaths occurred during the cholera epidemic of 1869, or in the ratio of 0·5 per mille.

The general good order and conservancy of this station may, it is thought, be fairly credited with some portion of the freedom from fatal attacks of cholera.

Nellore District.

39. The Nellore district appears to have been invaded by solitary cases of cholera from the neighbouring districts of North Arcot or Cuddapah in May and June. The Medical Officer of Nellore reports that it was brought into the district by persons travelling in carts from Cuddapah. It reached the town of Nellore in July, apparently in the same way, by travellers from Atmakur. It did not affect the prisoners in jail until August, when twenty-two persons in all were attacked, and eleven died. Cholera reached its maximum of prevalence in September, when it began to decline slowly. The mortality rose again in December. The district of Nellore like the neighbouring one of Madras to the south, is influenced in regard to cholera both by the south-west and north east monsoons. The total mortality however, less than one per mille of population, was slight for an epidemic year.

Nellore District under influence of both monsoons.

North Arcot District.

40. The North Arcot district, as before noted, seems to have been affected *via* Cuddapah in January, when three deaths are noted. In March five deaths, in May two, in June the mortality rose to thirty-six and in July to 705. In August there was a decline to 339, but in September, coincident with the arrival and dispersion of pilgrims at the great festival of Triputti, the deaths rose again to 549, after which month they slowly declined to 256 in December. The sudden rise of cholera in this district in the month of July would apparently tend to show that the general seasonal causes influencing the development of the epidemic must have been similar to those affecting the neighbouring district of Cuddapah and Nellore. Cholera began in the Wallajah Talook in June, thence it spread to Arnee and Vellore. The first case occurred in Chittoor (the Zillah station of the district) on the 13th July. In the Fort of Vellore on the 16th July. It is said to have been introduced into Chittoor by persons coming from Vellore. The prisoners in the Chittoor Jail were not affected although the disease did not cease to prevail in the station until the middle of October. Early in October three cases occurred in the Native Regiment at Vellore. The streams of pilgrims from Mysore and Cuddapah and Nellore appear to have been all affected more or less by cholera, and the disease was known to be virulent at both upper and lower Triputti in August, September,

Affection of pilgrims at Triputti.

and October. The extension of cholera by the Railway to Salem and Coimbatore, Bangalore and Conjeveram, was the most noticeable feature of the Triputti festivals. In the three former places cholera did not long survive the importation, but in the latter it assumed epidemic proportions.

Railway travellers from Triputti, affecting Salem, Coimbatore, Conjeveram, and Bangalore.

41. The district and town of Madras kept clear of epidemic cholera until the 2nd week in July. In the town some of the earliest cases were of cart men, strangers to the town, but the evidence of importation is not made out very clearly. It prevailed in a village named Damal about the middle of July and in the neighbourhood (but not in the town) of Conjeveram and along the high road from Vellore and Arcot to Madras. Early in October some of the Conjeveram inhabitants went to the Triputti festival (in North Arcot) and returned with cholera, from this date the disease began to spread in the town of Conjeveram, where the deaths up to the end of the year were 110 or 3·4 per mille of population.

Madras Town and District.

42. The epidemic of 1869 in the town of Madras was not so severe as in the years of 1860 and 1866. It took however almost precisely the same course as those earlier epidemics, beginning in the western outskirts of the town and extending afterwards to Vepery, Pursewalkum and the more thickly populated localities of Chintadrapett and Black Town. In all 568 persons died of cholera in the town of Madras in the year 1869. The mortality occurred chiefly in July, August, and September. The deaths were in the ratio of 1·3 per mille of population.

Incidence of epidemic slighter, but falling on some localities as in 1860 and 1866.

43. This epidemic is noticeable chiefly for the resolute measures resorted to for its limitation. When the disease was known to be approaching, arrangements were made in the Municipal and Medical departments for the supervision of the places frequented by travellers, and for the early segregation and treatment of the affected. Tents were pitched in convenient places for the reception and treatment of all applicants and a house was rented as a cholera hospital. Prepared medicines were distributed to the public by the Passed and other students of the Medical College, and when practicable, cases were sought out and treated in their own homes. No such general measures for the care of the civil population had been adopted since the epidemic of October 1818. Whether the force of the epidemic was mitigated by the humane action displayed on this occasion, may perhaps be an open question, but judging by the severity of former visitations it is only reasonable to conclude that the death rate may have been very considerably modified by the means resorted to.

Measures for the limitation of cholera undertaken by Government.

44. Although cholera prevailed in Madras epidemically from the middle of July yet it is worthy of observation that the disease did not immediately affect certain public bodies of men. Thus the Native Corps at Perambore was not attacked until the 5th August, and the Regiment at Vepery had no cases whatsoever. A few cases occurred in the Penitentiary beginning on 8th August, but the Lunatic Asylum and the Female Orphan Asylum had no cases at all. It did not reach the Fort St. George barracks in which Her Majesty's 45th Regiment was located, in an epidemic form, until the 7th September. (A single case had occurred on the 3rd August.) It may be considered still an open question

Exemptions in Madras Town.

Her Majesty's 45th Regiment attacked 7th September.

whether the outbreak amongst the European troops was not the result of a special importation of infection by arrivals from another locality where cholera had prevailed in an intensified form.

45. The circumstances of the outbreak in Her Majesty's 45th Regiment may fitly be recorded in this place, and they appear to be as follows:—

Cholera in Her Majesty's 45th: following arrival of Details from Burmah, and over-crowding of barracks.

Early in September the arrival of time-expired men and families from Burmah being daily expected, the Medical Officer of the 45th Regiment reported that the barracks were already full, the hospital unhealthy, and cholera prevailing in the town. He deprecated over-crowding, and the Deputy Inspector-General (Doctor Elliot) concurring in this view, recommended that the new arrivals should be sent on to Palaveram instead of bringing them into the Fort. At the period in question there was room only for seven additional men in the Fort. The Officer Commanding the division in remarking upon this communication on the 4th September observes that he has "personally inspected the arrangements under which the detachment of time-expired men who arrived from Rangoon on the 3rd instant, have been accommodated in the barracks, and that he does not consider it necessary that the detachment should be sent to Palaveram, as the barracks in which it is located are not inconveniently over-crowded and the details will remain in Madras but a short time."

46. The barrack in which these details were principally accommodated was the D barrack in the north-eastern angle of the Fort—a quarter somewhat notorious for the occurrence of cholera cases. The room, an upstair one, holds by computation sixty-four men. From the 3rd to the 7th September it had ninety-four men sleeping in it. There can be no question here as to the over-crowding being a grave cause of anxiety to the Medical Officers. On the 7th September the first case of cholera appeared, not however in the over-crowded barrack, but in a downstairs room, and on the same date the military authorities gave orders for the removal of one Company of the Corps to Palaveram. On the 8th a second case of cholera occurred, this time in the over-crowded barrack, and the over-crowding was then relieved by the despatch of the Burmah details to Palaveram. Up to the 9th September four cases had occurred within the Fort.

Removal of troops from over-crowded barracks to Palaveram. Persistence of cholera in the Detachment.

47. The company which moved out to Palaveram on the night of the 7th September unfortunately took with them, in a virulent form the seeds of cholera. Between the 7th and 9th there had been seven men attacked and six of the cases proved fatal. No more cases occurred, and the men after keeping out in the camp until 26th October went into barracks at Palaveram in good health.

Communication of cholera to villages en-route to Palaveram.

48. In marching from the Fort to Palaveram these cholera stricken troops went through the suburban villages of Sydapet and Guindy, to which cholera had not up to that date spread. On Saturday the 11th September cholera appeared both in Sydapet, and Guindy, the Detachments having marched through on the 7th and 8th. The Collector of the district attributed the outbreak to communication of the inhabitants with the troops in passing through.

Saint Thomas' Mount not affected by the Detachment.

49. In marching to Palaveram these detachments passed through the Military Cantonment of Saint Thomas' Mount. There had been a case of cholera in the Mount bazaar on 23rd August and another on the 5th September; both occurred before the march

of the detachment of the 45th Regiment. On the arrival of the troops at Palaveram one man obtained a pass to go back to Madras, and having got so far as the Mount, went to a comrade's house where he sickened, and ultimately died of cholera in the Royal Artillery Hospital at Saint Thomas' Mount on the 9th. No extension of the disease immediately followed and the Royal Artillery at the Station escaped. On the 26th September another case occurred in the bazaar, and early in October a few more, including a Staff Serjeant and his family, residing in a detached bungalow. Altogether there were nine cases of cholera at Saint Thomas' Mount.

50. *Palaveram.*—The Military Cantonment of Palaveram which has long enjoyed a repute for its freedom from cholera was on this occasion destined to be put to a severe test as to its power of resisting epidemic influences. The Company of the 45th Regiment which moved into the station on the 7th September, by some oversight, had been brought into the vacant barracks of the station before it was known to the local authorities that they had been marched away from Madras on account of cholera. On the fact coming to notice, the Company was moved into camp and isolated as much as possible from the station.

There were at the station, at this time, the European Veteran Company of Artillery with their wives and families making a European population of between 700 and 800 persons; about 200 sepoys of the Native Infantry Depôt, and a bazaar population of about 3,000 persons.

Cholera in Palaveram bazaar on the 9th September.

51. On the 9th September a poor woman who had been employed in carrying grain to the camp of the 45th Regiment the day before, was taken ill and died of cholera in the Palaveram bazaar. She lived in a wretched, low, dark, damp and ill-ventilated hut. On the 12th September another bazaar case occurred. These continued slowly to increase here and there, until 16th October, by which time twenty-four cases of genuine cholera had been treated, seven of which proved fatal. Choleraic diarrhœa also prevailed very generally in the bazaar.

Escape of European community at Palaveram.

Sanitary condition of Palaveram bazaar.

52. Cholera has frequently been introduced into Palaveram before, but there has been this peculiarity about the station, that the disease has never been observed to spread from the cases so introduced, in epidemic fashion. In the year 1857-58, it is stated that after a family, which had fled from the Mount to avoid cholera, had been attacked, some cases happened in the bazaar, but no particulars as to the number are recorded. Thanks to the watchful care of the Medical Officer, Surgeon H. T. Shaw (whose long residence at the station enables him to give very valuable testimony as to the general exemption of the station from cholera) every case which occurred in 1869, was brought under medical treatment, and the localities in which the people sickened subjected to immediate purification. The disease was confined to bazaar people, except in one instance that of a Sepoy's wife, and the whole European community escaped. Even among the bazaar people only one person in good circumstances was attacked. The house in this case was substantial and well built, but the drainage was bad. In nearly all the cases the houses inhabited by the cholera patients were old, dirty, and with damp rising up the walls, some had a green fungus growing on the brick work. The bazaar was laid out many years ago for a large cantonment and since the station has ceased to be

occupied by Corps of Native Infantry, the bazaar buildings are more numerous than the inhabitants require. The natural situation of the bazaar is excellent. It is built on a hill with sloping ground nearly all around it, and with perfect natural drainage. The wells which supply drinking water are far enough away to escape any sewage contamination. The water, percolating through a laterite soil and crevices of gneiss rock, is excellent. To the great advantages of soil, water, and situation, the station would appear to owe its powers of resisting epidemic influences. It has no absolute immunity from cholera, but the accumulated experience of very many years shows that cholera does not find a congenial home in the locality—See Appendix (IV).

Immunity from cholera, shared by some other Military stations in neighbourhood.

53. It may be noticed here that the Military station of Palaveram is only one of several others in the same neighbourhood where epidemic cholera seldom finds a resting place. The Military station of Saint Thomas' Mount, the European Depôt of Poonamallee, and the old pensioners' station of Tripasore are noted for an almost similar immunity. In all these localities there is red lateritic soil and with the exception of St. Thomas' Mount good water-supply, from wells sunk in laterite, or in rock.

Extension of cholera to Chingleput.

54. The extension of cholera beyond Palaveram can be traced to Chingleput —a small town (the Sudder station of the Madras District) twenty-two miles to the south,—where in September and October eleven deaths occurred. The prisoners in Jail were unaffected.

Monsoon influences on cholera in Southern India.

55. In Southern India there are certain districts which appear to be more liable to cholera epidemics during the prevalence of the south-west monsoon than at other times. These districts may be roughly described as included in the country to the eastward of the ghauts running from Cape Comorin up to the Deccan and Central Provinces, and lying between the 13th and 19th degrees of latitude. Below the 13th degree of latitude it happens, as a rule, that the cholera season is usually coincident with the time of arrival of the north-east monsoon. The tract of the country on the western side of the ghauts is subjected to special laws of its own in regard to cholera distribution, which will be referred to hereafter. In the districts between the 13th and 14th degrees of latitude cholera may prevail with either monsoon, or with both. Thus the towns of Nellore and Madras on the Coromandel Coast are liable to cholera both in the south-west and north-east monsoons.

But Bellary, Ghooty, Secunderabad and Kurnool rarely suffer to any extent except during the south-west monsoon. Even in 1868, when cholera travelled downwards from Secunderabad during the season of the north-east winds, it did not spread to many districts until the arrival of the S. W. monsoon. Trichinopoly, Tanjore, and Tinnevelly on the other hand are generally most severely attacked in the season of the north-east monsoon.

South-Arcot.

56. This explanation is necessary in referring to the seasonal distribution of cholera in the South-Arcot District—a district as it were on the border line, influenced to some extent by the meteoro-

logy of both monsoons. The district was very free of cholera all through the year until October, when some cases occurred in the Municipal town of Cuddalore. The epidemic was very slight and confined apparently to a few localities, only 544 deaths having been registered in the whole district and of these 393 occurred in the month of December.

Cuddalore.

The old town of Cuddalore is said to have been free of cholera.

No general prevalence of cholera in Salem, Coimbatore, Madura, Tinnevelly, Malabar or Canara.

57. Cholera as a general epidemic did not affect the districts of Salem, Coimbatore, Madura, and Tinnevelly, nor did it pass over to the country on the western side of the ghauts, including the provinces of Travancore and Cochin. A few localized outbreaks in these districts will be noticed further on.

58. There was, however, considerable prevalence of cholera in the districts of Tanjore and Trichinopoly—a typical example in fact of the cholera of the cold season as it affects those districts.

Tanjore.

59. The district of Tanjore, rich and fertile as it has become from the waters and alluvial of the sacred Cavery, presents some physical features which *a priori* might be thought to favour the habitation of cholera as an endemic. It is a district almost entirely alluvial and in which irrigation is largely practised. The great river and its numerous irrigation channels bring to it unlimited supplies of water and fine soil in suspension, which are spread out on the rice fields. The greater portion of the natural drainage of the Cavery valley is expended in the fertilization of this district.

The river before it debouches into the sea breaks up into numerous small and insignificant channels, but the drainage into the sea by these channels is unimportant. The great bulk of the water brought down by the Cavery passes off in vapour from the surface, or sinks into the alluvial subsoil. Here apparently are conditions favourable to the indigenous production of cholera, and the study of these conditions (common in a less degree to the Vigay river to the south) is not a little complicated by a knowledge of the fact that the district is one largely peopled by the priestly caste of the Hindoos, and that shrines and pilgrims are numerous, and that the opportunities for the distribution of cholera by travellers are equally frequent.

Cholera as endemic in Tanjore.

Years.	Cholera Deaths.
1866...	... 8978
1867...	... 8394
1868...	... 2508
1869...	... 4563

60. In looking over the death returns of this district for the whole period during which registration has been attempted, it will be observed that cholera appears to have had a persistent hold on the locality, such as has not been noticed in any other district. During these four years not a month has passed by without cholera deaths being included in the register. Even during the year 1868, when Southern India had a general immunity from cholera invasion, the Tanjore district showed 2,508 deaths.

If cholera is an endemic of the soil in any locality, it would appear to be so in the district of Tanjore. In the year 1869 cholera deaths occurred in every month, but the epidemic began to increase notably in October, the heaviest mortality of all being in December when 2,226 deaths were reported. In the four years for which records have been preserved there was less seasonal

regularity in the distribution of cholera than is generally observed in other places though on the whole, the cold season yielded the highest proportion of deaths.

Municipalities in Tanjore.

61. The Municipalities of Tanjore and Cumbaconum appear to have suffered in greater proportion than the district itself. At Negapatam it is stated by the Medical Officer that cholera broke out after the annual festival at Nagore in October. In Tanjore town it prevailed in August, September and October, and again in December. At Cumbaconum in an epidemic form in November and December, though solitary cases occurred in most months of the year. Manargoody suffered principally in October and December, and Mayaveram in November and December. At Tritapundy, where a dispensary has recently been established, cholera raged from September to the end of the year.

Trichinopoly.

62. The district of Trichinopoly occupies the higher portion of the Cavery valley, and the causes which contribute to the endemicity of cholera in Tanjore operate to some degree in this district also. A few isolated cases occurred throughout the year, but it was not until November that the disease began to spread. The first authentic accounts we get of cholera in this district have been drawn up by Native Surgeon Bauloo, who proceeded into the district for the purpose of conducting the inquiry.

Cholera in the Cavery valley Moosery Talook, in October 1869.

63. The first cases were reported in a village of the Moosery Talook, "Alasgoor" on 28th October, about two miles from the northern banks of the Cavery. From this spot it travelled down the right bank of the Cavery from west to east, past the town of Moosery, almost in the face of the north-east winds. There are some grounds for supposing that the canal water along the course of these villages might have got contaminated by cholera discharges and have helped in the propagation of the disease. Cholera continued chiefly in the Moosery Talook, all through November, and on the 16th December only it reached the native town of Trichinopoly, the Cantonment remaining healthy until the 23rd. The disease did not in fact become generally epidemic in the locality until after the great Sreerungum festival, which fell in December and lasted for twenty days. In the district jail only one case occurred, that of a man who had been working outside. In the central jail no cases at all. It is observed of this district generally that the north-east monsoon was much heavier than in the preceding year 1868, and that the rain-fall was sufficient to saturate the soil very completely. This epidemic prevailed in the town and suburbs of Trichinopoly until the end of February 1870, when it died out almost completely. The Native troops in Cantonment suffered rather severely, though only three cases and one death had been reported up to the end of 1869.

Town of Trichinopoly, reached only on the 16th December.

Influence of the Sreerungum festival.

Immunity of Central Jail.

Large rain-fall in N. E. monsoon.

Salem District. Importation by Railway.

64. The only cholera of importance in the Salem district appears to have been the result of importation. In September a railway guard who had been attending upon a comrade at Coimbatore stricken with cholera, was attacked at the Salem Railway Station, and died on the 27th September. The next day the body was taken into the town of Salem three miles distant and buried. Two days after (30th) cases of cholera were

reported in Salem, and it continued to prevail until 14th November, when it ceased for a while, appearing again, without any assigned cause, on the 9th December. The disease never travelled very far away from the town of Salem and the total cases in the district were insignificant. The conditions needful for its epidemic diffusion appear to have been wanting. The prisoners in the central jail were not affected. In the town of Salem it is said that the municipality has effected many improvements of late years, and that the force and virulence of cholera, once the most common disease in the old jail, are sensibly abating. It will be interesting to watch the history of the municipality in this respect.

Municipal improvements in Town of Salem.

Coimbatore.

Cholera brought to Railway station by travellers from Triputti.

65. A very local out-break of cholera in Coimbatore, dependent on the carriage of pilgrims from Triputti, one of whom it is alleged either sickened or died in a railway carriage, which carriage was brought on to Coimbatore, is noticeable, for the reason that the stress of the disease was confined almost entirely to a dirty village which has sprung upon the out-skirts of the Railway station. The facts as recorded are briefly as follows:—

66. On the 16th September a man in a third-class carriage travelling west from Triputti was seized with cholera and died, it is said, *in transitu* before the train reached Salem. This latter statement however is denied by the railway officials. The carriage in which the disease occurred went on to Coimbatore, though whether it went further west could not be ascertained. It is quite certain that no disinfection of a carriage took place at the Coimbatore Station, and it is probable (though not proved) that the carriage was swept out at the station, as all empty carriages are.

First case, the child of a Railway Official 21st September.

Outbreak confined chiefly to Districts round the station.

67. On the 21st September the child of a Railway official at the Station was attacked by cholera and recovered. In the four following days nine cases occurred. In a short time out of the small village of Poothanore and the neighbouring hamlets there were seventy-one cases of cholera and forty deaths.

Extension to Coimbatore Town, and dying out of epidemic.

68. In the town of Coimbatore, distant only 4 miles, and in constant communication with the Railway station villages, only six cases and two deaths occurred. In all these cases there had been communication with Poothanore. Whatever the influences may be which favour the epidemic spread of cholera, they were wanting in Coimbatore and Salem in September and October 1869. The outbreaks in both cases were purely local, the first cases being imported by travellers from districts of epidemic distribution to the east. During the time cholera must have been incubating at Coimbatore, it is stated that the average temperature noticed in the observatory of the station was 87°·1 Fah. ozone moderate 75°, wind No. 20 S. W. The period in fact was nearly the end of the monsoon on the western coast.

Meteorological condition at Coimbatore.

Malabar.

69. The districts of the western coast which are exposed to the full force of the south-west monsoon are sheltered from the rains of the north-east monsoon, by the high range of mountains which run from north to south along the western coast. While the heavy rains of the south-west are falling in June, July, and August, it is rare to

hear of an epidemic distribution of cholera in the Malabar country, and yet this is not always so, for in 1865, one of the severest epidemics on record, prevailed in Malabar all through the months of the monsoon rains. It has been noticed of the sea coast stations on the western side of the peninsula, that cholera is apt to prevail in the breaks of the monsoon, or soon after its close; but probably the greatest and most regular prevalence occurs when the land winds (*i. e.*, north-east) blow harsh and dry after becoming exhausted of their moisture in travelling the peninsula from north-east to south-west. These are undoubtedly the unhealthy winds to residents on the western coast.

70. During 1869 there was very little cholera in the western districts. There was slight prevalence both in South Canara and Malabar, but the districts to the southward, Cochin and Travancore, were free. At Calicut a few cases were noticed in August, September, and October, and a curious circumstance deserves to be noted in connection therewith. The disease appeared in one of the breaks of the monsoon in August, and concurrently with the appearance an event occurred which has often been remarked before. The coast for miles up and down was strewn with myriads of dead and dying fish. The cause of the fish mortality is obscure, it does not occur every year, nor at the season when the greatest bulk of fresh water is discharged into the ocean. It has been observed to prevail sometimes for hundreds of miles along the coast, and at other times dead fish have been met with far out at sea. The stench from the sea during such periods is very disgusting.

Mortality of fish at Sea coincident with Cholera along the Western Coast.

A Civil Surgeon of several years' experience of the station has observed that whenever the piscine mortality is great, cholera or choleraic diarrhœa is never far off. The troops on the western coast stations were wholly free of cholera during 1869.

71. The revenue districts of the Kistna and Godavery have had a complete immunity from cholera during 1869. In the Kistna District three deaths are returned, and in the Godavery none at all. The population of these districts is 2,660,000. Malarious fevers were, however, very fatal in the Godavery District in the month of November and December.

Northern Coast Districts.

72. Further north in the Vizagapatam District we again come upon cholera, but not at all in a severe form. The stress of the disease fell in the months of July, August, September, and October, but chiefly in the two former months. It prevailed slightly in the sea-port municipalities of Vizagapatam and Bimlipatam, and with more activity in Vizianagrum where fifty-six deaths are recorded as due to cholera. A few cases occurred in the Military Cantonment, but the Sepoys all escaped. The cholera death rate of the whole district was only 0·5 per mille.

Vizagapatam.

73. The district of Ganjam towards its northern extremity comes within the endemic region of cholera in lower Bengal, and the progress of the disease apparently follows here the general law of development observed in the endemic field in question. But the epidemic advance from this point when cholera oversteps its natural boundary, is generally southward along the coast even in the face of the south-west monsoon. Thus in 1869 cholera began in the north-east of the district about the end of May and spread eastward and to the south, advancing against prevail-

Ganjam.

ing winds reaching Berhampore on 23rd July, where it severely attacked the inmates of the Jail. At Chicacole no cholera occurred, though the disease abounded in all the villages near. At Russelcondah in this district, a station long notorious for its cholera immunity, there was no prevalence of it. The hilly tracts of the district and of the Northern Circars generally, appear to have been quite free.

74. The tables in the Appendix (V) will furnish all the particulars in regard to the population of the several Districts, Municipalities, Jails, &c., and the monthly cholera deaths.

Throughout the whole of the Madras Presidency, the cholera deaths, amongst the civil population were 21,034 or at the rate of 8 per ten-thousand of living.

75. *Mysore Province.*—Epidemic cholera was introduced into the eastern talooks of the Bangalore district, according to the district authorities, by pilgrims dispersing from Triputti in September. In the town of Bangalore,—with a population of 52,649 persons,—150 deaths occurred from cholera in September and October. In the Military Cantonment, population 79,301, the first case occurred on the 8th September in a pilgrim from Triputti, who arrived by railway in a state of collapse. The carriage in which he travelled was crowded with people, and soiled by the discharges from his stomach and bowels.

Only four deaths occurred in the Military Cantonment of Bangalore (none amongst the troops).

Prompt measures were taken on the occurrence of each case to disinfect the places where they had occurred.

Cholera prevailed also in the talooks of Kengiri, Sarjapura and Hosakote of the Bangalore district. The western portions of the Mysore province were not at all affected, except by the deaths of a few pilgrims returning from Triputti to the Western Coast.

76. *Hyderabad.*—The cholera which had invaded this province in 1868, was reproduced on the setting in of the south-west monsoon, in several places. Thus at Hyderabad, Secunderabad, Chudderghaut and Hingolee, the disease was re-established and continued to be severe and fatal until September 1869, when it ceased.

77. *Central Provinces.*—The invading cholera of 1868 seems to have been re-produced in the Central Provinces in 1869. The Madras troops stationed at Kamptee, Raepore, and Hooshungabad suffered, though not very severely.

78. *British Burmah.*—The only Military station in British Burmah where a severe out-break of cholera occurred, was Thayetmyoo. The circumstances are very carefully recorded by the Medical Officer of H. M.'s 76th Regt., in his special report on the subject, which, with the sanction of Government, is printed as one of the Appendixes (VI) to this brief summary of the progress of cholera in 1869.

79. Great difficulty has been experienced in obtaining authentic information as to the exact dates of the first appearance of cholera in the several stations

and districts. The registration of deaths in this Presidency is effected by officials of the Revenue Department, but, as regards the present year 1870, the assistance of the Police has been sought to report the daily progress of cholera in the larger towns and villages throughout the country. Even with this assistance the difficulty of getting at first cases is very great. The people generally have a superstitious horror of naming the disease, and are unwilling to admit the fact of its presence amongst them, so long as the mortality does not attract the attention of the Police. Time and perseverance in the record of facts will, it is hoped, effect changes for the better in this respect.

W. R. CORNISH, F.R.C.S., Surgeon,
Sanitary Commissioner for Madras.

1st *May* 1870.

APPENDIX I.

Extract of Report on a Cholera Epidemic at Secunderabad during 1868-69, *by* Dr. E. Balfour, *Deputy Inspector-General, Indian Medical Department.*

The Sanitary Commissioner of Madras has asked me if cholera was epidemic amongst the Civil population of Secunderabad at the time of the march of Her Majesty's 2nd Battalion 21st Regiment. He also requested me to put myself in communication with the Deputy Inspector-General of the British Medical Service, with a view to ascertain whether the cases which occurred in that Corps are to be attributed to the previous access of the men to the Secunderabad bazaar, or to intercourse while in camp with persons visiting it from Secunderabad ; and he inquires whether, in my opinion, that attack of disease originated with the Regiment, and, if so, to what it may be attributed. The Inspector-General further requests me to send the replies to these questions through his office, and to reply to them in as full detail as possible, and I now report accordingly.

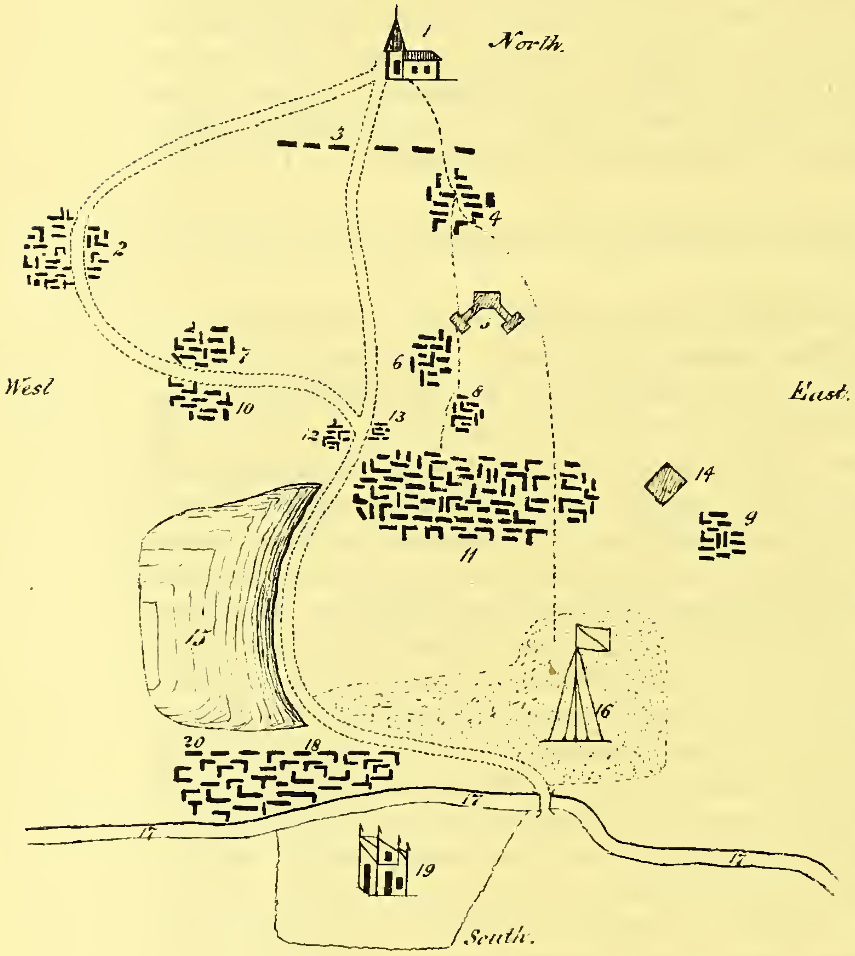
2. Cholera has repeatedly assumed an epidemic character amongst the Native races in and near Secunderabad.

All through the year 1865 it continued to hang about this place and neighbourhood.

The Hyderabad Subsidiary Force furnishes to the Resident at Hyderabad an escort of Cavalry 25 strong, and Infantry 234 strong. Amongst them and their authorized followers there occurred in 1865 eight cholera cases, one of them in February, five in April, and two in June, of whom four died. In the following year 1866, it recurred at Chuderghaut and in the city, and on the 28th August 1866 it appeared in Secunderabad Cantonment, where it lingered till April 1867. From its prolonged stay, I came to the conclusion that it was endemic here, but that opinion is not now tenable, as it ceased amongst the Asiatics of this Cantonment from April 1867 till the 14th November 1868, and in this long interval only a very few scattered cases have been reported as occurring in the city of Hyderabad. When I came to this Division in 1865, this city was certainly very dirty. When describing it in 1866, I mentioned (pages 4 and 25) that every town had dirty sites, but Hyderabad was altogether filthy. It had been the opinion, both of Surgeon-Major (now Deputy Inspector-General) Penny, and of the late Assistant Surgeon Pemberton, M.D., that cholera invariably first showed itself in Hyderabad and then appeared in Secunderabad Cantonment, and I reported that course of it, on their authority—(Trimulgherry Report, page 4, paragraph 6). Shortly afterwards, however, Mr. (now Sir Richard) Temple sent to His Excellency the Minister an extract from my Report, paragraph 6, and part of pages 25 and 26. In doing so, he took the opportunity of mentioning my views as to the line followed by a cholera invasion, and at the same time of urging that the city be cleaned. His Excellency Sir Salar Jung, however, replied that in his experience cholera invariably entered Hyderabad *from* Secunderabad. Since the date of my report of 1866, His Excellency the Minister has very greatly improved the city, though it is still very dirty ; and, on the present occasion, the cholera epidemic occurred as His Excellency had mentioned, for it undoubtedly first appeared in Secunderabad on the 14th November, then in Chuderghaut on the 15th, and others on the 23rd November, and thereafter in the city of Hyderabad on the 24th November 1868.

3. In describing the course of this epidemic, several places will need to be mentioned, the relative positions of which may, therefore, with advantage, be briefly indicated. The locality which relates to this Cantonment is a north and south line, nowhere more than four miles broad, but about fourteen miles long. It has the city of Hyderabad on the extreme south, and Bolarum Cantonment on the extreme north. Along this line are three Military Cantonments, viz., that of Bolarum with two thousand Cavalry, Artillery, and Infantry belonging to the Hyderabad Contingent ; that of the Gosha Mahal, where two thousand of His Highness the Nizam's reformed

troops are located, and intermediately lies the Secunderabad Cantonment in which are located the Hyderabad Subsidiary Force, a body of about five thousand British and Native Soldiers of the Madras Army. In the entire area, about 45 square miles, the Asiatics and British may amount to about 300,000 people, for it includes the city of Hyderabad on the south, with its populous environs ; it has the British Residency at Chuderghaut, also populous. Twelve miles to the north of Hyderabad is the Military Cantonment of Bolarum, already mentioned, and in the centre is the Military Cantonment of Secunderabad, the largest in India, which of itself covers nineteen square miles, and has within it besides the 8,000 (7,938) houses of Secunderabad town and the Barracks and hutting lines of the Military, about sixteen hamlets, and villages furnishing in all a population of at least 45,000 people exclusive of villages and hamlets lying immediately outside the Cantonment boundary. The following diagram will facilitate references :—



1. Bolarum.
2. Boweupully.
3. Artillery.
4. 1st European Infantry Barracks.
5. 1st do. do. Hospital.
6. 2nd do. do. Barracks.
7. Tarban Infantry Lines.
8. Maredpully.
9. Chilkulgoodem.
10. Sappers and Miners.
11. Secunderabad Town.
12. Nullagoottah district.
13. James' Bazaar.
14. European Cavalry Barracks.
15. Hoossain Saugor Tank.
16. Chuderghaut.
17. Moosa River.
18. Begum Bazaar.
19. Hyderabad city.
20. Gosha Mahal.

4. The first person taken ill with cholera in this Cantonment in 1868 went from this to Elwal (Bolarum) in the afternoon of the 13th November, and was brought back from Elwal into the Cantonment ill with cholera, about 2 A. M. of Saturday morning, the 14th November, and the march hence of Her Majesty's 2-21st Regiment, about 2 A.M. of the 14th, was simultaneous with the presence here of that first case of cholera.

5. Four soldiers of that Corps are now reported to have subsequently suffered from this disease. Of these four, none of them were attacked in this place. But at 2 A. M. of the 16th November 1868, viz., forty-eight hours after the departure of the 2-21st Regiment, and 8½ miles from this place at Burhan Sahib's Durgah, two were seized with it ; on the 16th also a third case presented itself 19¼ miles from this near Shumshabad, and fifty-six hours after they had left this ; and the fourth case is reported on the 17th from Palmakhel, 27¾ miles distant, and seventy-two hours after the march of the Regiment. Of these four cases, two died and two recovered.

6. Up to the present, there has not been received any evidence to show whether the four sufferers from this disease in the 2-21st Regiment had access to the Secunderabad bazaar prior to marching or when in camp; nor whether any persons visited them from Secunderabad. This was seemingly the question which I was required to refer to the Deputy Inspector-General, British Medical Service, and as his reply did not give the asked-for-information, I again brought this particular point to his notice, and he mentioned, in answer, that his letter, No. 1,407, was intended to apply to the 2-21st generally, not solely to the individuals attacked. He, however, added that on the evening of the 14th, much of the married people's baggage was still leaving the Cantonment, and that he has a recollection of seeing one or two men of the 2-21st in Secunderabad on the 15th November.

7. On this point, therefore, what has been proved is that the 2-21st Regiment, as a body, moved out from their camp at North Trimulgherry, about 2 A. M. of the 14th November simultaneously with the presence, in this Cantonment, at a place four miles from their Barracks, of a case of cholera; but there is as yet no evidence to show whether any of the four soldiers, who were attacked on the 16th and 17th, 8½, 19¼, and 27¾ miles from this, had any personal intercourse with any person in or from this Cantonment.

8. In reply to the 3rd question, whether, in my opinion, the disease originated with the 2-21st Regiment; and, if so, to what it may be attributed; and, in accordance with the Inspector-General's request to write in as full detail as possible, I have the honor to report as follows:—

9. During my service in this division in the past three years, I have traversed about 7,000 miles of it in three inspection tours, and from all my inquiries in the towns and villages and of the Medical Officers serving under me, it had seemed to me that cholera has hitherto appeared in an epidemic form in the Hyderabad Territories every 3rd or 4th year. Its preceding outbreak had been in 1865, and I had warned the Medical Officers to be prepared for its appearance in 1868. All through 1868 the disease, as reported in the Public Journals, had seemed to be coming southwards, until at last it appeared in Berar. Cases occurred at Ellichpoor, near Yeotmahl, at and near Oomrooti, at Akolah, Akote, Kamgaum, Jaulnah, Bassim, Ballapoor, near Buldanah, then in the South, at Mominabad, and at Gunga Khair.

10. At length on the 18th August I informed the Brigadier-General Commanding this force of the probability that cholera would continue to come southward, and, in the possibility that it would visit Secunderabad, I recommended action.

11. It may, however, be confidently stated that, up to the 13th November, there was no case of cholera in any part of Secunderabad Cantonment, nor in the city of Hyderabad, nor in any of that city's populous suburbs, nor in any of the hamlets, or villages around. It may also be mentioned that up to that time there had not been reported any case of cholera nearer than Mominabad, Ganga Khair, Hingoli and the Woon Taluq, all of them between 160 to 200 miles distant from Secunderabad; and the history of the first case here is as follows:—

12. There is an annual religious gathering at Elwal, about 1½ mile from the northern boundary of this Cantonment. The object of their worship is in a temple of Vencattaeshwara, built on the extreme south of, but outside, Bolarum Cantonment, and during the festival some thousands of people visit it. The visitors have never been counted, but the festival lasts for four days, in which interval about 6,000 or 7,000 people now-a-days go to the locality, and about 1,000 people may encamp around the temple nightly with the object of performing their devotions there at daybreak. In 1868 on the 27th October I carefully went over all the grounds surrounding the temple, and it was clean indeed; it is always very cleanly, for I have often seen it, and I think that in 1867 I saw at one time about 5,000 people assembled here.

13. The former Peshkar-i-Dewan, the late Rajah Chundoo Lall, was wont to visit that temple annually; and, when he was a visitor, many times 5,000 people would be there. I was serving here with the Artillery in 1838, and was present at the temple at one of Rajah Chundoo Lall's visits, and I estimated the entire gathering at about 18,000 people. In the present day, however, there are nothing like such numbers. Family parties, seemingly of the people of this neighbourhood, go to worship there, and they seem happy and contented. But a very great

number of this Military Camp appear to visit the temple merely to drink, and the amount of drinking surpasses all that I have ever seen at any festival in any part of the world. Such, however, is only an aggravation of the daily habits of the people of this place, where the drinking and drunkenness exceeds all that I have ever seen.* It was, however, the servant of a family party to Elwal who was the first attacked.

* There are 76 Spirit Vendors' shops in the Cantonment, and the quantity of palm toddy drunk is enormous.

14. I have already mentioned that, up to the 13th November 1868, there had not been any cholera case here, or near this place.

The first day of the Elwal Jathra of 1868 fell on the 13th November. On that night the first case occurred at Elwal, and the Cantonment Magistrate, Secunderabad, sent to me the following memorandum regarding it :—" The first case of cholera, which occurred in the late " outbreak of the disease at Secunderabad, was that of a cart-man in the service of Comiti " Rajiah. This man drove the family of Rajiah to the Elwal Jatra, but was attacked there with " vomiting and purging, and returning into Secunderabad died in Macleod Goodah.

" The man was a resident of Kurnool ; had come here with his cart and remained some-" time a month or so, when he took service as above." On the day after receiving the above memorandum, I myself sent for Rajiah, the shop-keeper, and took down the following statement :—

" Rajiah, a Comiti Baniya, lives in the 12th Regiment lines, near the house of Jungum Nagiah. Wife and children were driven in own carriage to Bolarum temple on the pilgrimage day ; the driver was Veerappah, a native of Kurnool ; he was my servant, on Rupees 5 monthly ; he had been my servant for only four or five days, not for ten or fifteen ; he came from Kurnool about two months ago, having gone there from this for stones. Wife and children went from this about 3 or 4 in the afternoon. On arriving there, the bandyman, Veerappah, had two motions ; he was then put inside with the family, and the carriage was driven home by my brother, Sevannah. The carriage returned about the third watch of the night or third or fourth ghurri (3 A.M.) I saw him on his return ; he had been vomiting and purging on the road, and was so on his return, and continued so till he died at 2 P.M. of the following day ; he died in the Gari Khana (cart-shed) at Macleod Goodah, belonging to Butchoo Veeriah ; I have three carts, and the Pundit schoolmaster has three carts there, for which we pay Rupees 2 each. There was a rumour of cholera in Macleod Goodah, cannot tell whether it was on the day of death of the servant or before ; I buried him ; I did not go to the funeral ; only gave Rupees 4 : the other cart-men conducted the funeral ; all my three carts have been taken to Goolburga on the 2nd instant by a gentleman, who resides south of the post office.

15. It will be seen from the above that this first case of cholera occurred in a man who left Secunderabad in the afternoon, and in whom the ailment appeared about 10 A.M. of the night of the 13th November ; that the man was brought back to the Nullagoottah division of Secunderabad about 2 A.M. of the morning of the 14th and died about 2 P.M. of that day. About 4 P.M. of that day the Cantonment Magistrate reported four attacks, and two deaths. There was no further report on Sunday ; but on Monday morning, I visited Nullagoottah, and found several people ill, some hopelessly so. In my diary of that date, I mentioned that " the " locality in Nullagoottah, where cholera cases have occurred, is quite close to the western end " of the Cantonment bazaar drain. This is the most unfavorable part of Nullagoottah ; houses " have been built close to the open drains, and several of them seemingly over some of the " covered drains. There is a large covered drain which was recently repaired, but its roof " stones in several places have fallen in, and water is running out from the covered drains " into the open, close to a house where a cholera case is lying ill. There are potters quite " near, and lime-kilns a little to the west ; a double latrine for men and women is near, and " much fresh ordure is ready to be removed. The interior cleanly, but ordure smell is great ; " outside the fluid is attempting to escape, and forming puddles; and all round unclean. There " is garden cultivation near, and squares are now being watered. The locality of the latrine " is evil.

(1.) " A latrine should be constructed away to the west, and suitable roads leading to it.

(2.) "Extra establishment needed to keep clean the present latrine and locality, until "the new latrine be erected.

(3.) Attention to the state of the drains is urgently needed.

(4.) The cultivation near should be stopped, and when cholera cases cease all the grounds "levelled.

(5.) "The enclosed ground on the west should be thrown open.

(6.) "East and west streets, at least three in number, are needed.

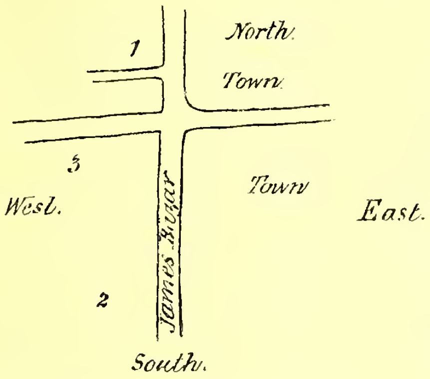
(7.) "The hovels close to the drain should be purchased up.

(8.) "All pot and lime-burning there and within the Cantonment should cease, and I "send transcript of the above to the Brigadier-General, and another to the Magistrate."

16. The outbreak of cholera at Nullagoottah was sudden and severe.

About 4 P.M. of the 14th November a memorandum from the Magistrate showed four attacks and two deaths on that day. Another memorandum, of date the 16th, still showed four attacks on the 14th, and only one death; but thirty on the 15th. As there was evidently some confusion in the mode of reckoning, the return was adjusted on the 19th, and it then became known that there had been fourteen cases on the 14th, seventeen cases on the 15th, eleven cases on the 16th, fourteen cases on 17th, and nine on the 18th, a total in five days, of sixty-five cases with twenty-two deaths. It continued in that unhappy place uninterruptedly for fourteen days, during which time ninety people were attacked and fifty-five died, and occasional cases continued to recur up to the 14th December, to which date there were ninety-three attacks and fifty-eight deaths in the Nullagoottah, part of Secunderabad alone.

Date.	Seized of cholera.	Died of cholera.
14th November ...	14	3
15th do ...	17	7
16th do ..	11	6
17th do ...	14	2
18th do ...	9	4



1. Macleod Goodah.
2. Nullagoottah.
3. Bhooipoora and Mudigapoora are all quite near to, but from the extreme western portion of, Secunderabad town. The last three of them are built over a granite elevation, uneven and rocky, traversed by a great green stone dyke,* running north-east and south-west. It has, like other parts of this town, many small covered drains, and the great drain of the Cantonment passes amongst its most northern part. That drain runs the entire length of the Civil town from east to west, and is a natural water course, between the hammocks and swells of granite over which this town is built. There is no poverty or starvation in Macleod Goodah, Nullagoottah, Bhooipoora, or Madigapoora, which are occupied by well-to-do people, earning their bread in all the avocations of Indian social life. They have, however, many potters with their kilns; many milkmen, with their cattle; there are lime-burners, cart and cattle stands. Cart-shed, latrines, and houses are built close up to the great water course drain. They are often filled with fever, and at seasons guinea-worm greatly prevails in them.

*Hence the name "Nullagoottah" black-hill.

17. Undoubtedly, in a sanitary point of view, that is the worst part of this town. But, in the preceding epidemic of cholera, which lasted at least from the 28th August 1866 till April 1867, and during which there were 158 deaths in forty districts of this Cantonment, the Nullagoottah District had only five casualties, the chief violence of the

*Grass Mundi	14
Chota Mulkapore	10
Russulpore	10
Tokata...	9
Jail Street	8
Regimental bazaar....	8

Toddy ...	7
Lalla Church Street....	7
Market bazaar	7

1866-67 outbreak having fallen on comparatively distant places,* I mention this to prevent a conclusion that the state of Nullagoottah District necessarily invited this outbreak.

18. In my description of this town in my report of 1866, I fully detailed its sanitary defects : and as there has been no change made (only one north and south street is now in progress) I need here only refer to my former printed report with the additional brief remark, that the very unfavorable conditions described in it urgently call for remedy, alike for the inhabitants' own sakes, for the protection of the great body of European and Native Soldiers in this large Military Cantonment, and for the safety of the numerous towns and hamlets to which the roads from this great centre lead ; for about 150 carts and 500 bullocks daily enter and depart from Secunderabad town.

19. After the disease broke out in Secunderabad, this town seems to have become a centre from which it radiated to other localities. It remained in the Nullagoottah District of Secunderabad town exclusively for five days, and then began to appear elsewhere both inside and outside of the Cantonment: but its spread was eccentric.

20. Bordering all the east side of Nullagoottah is James' bazaar, a wide street of shops, with the usual piece goods, to which there is great resort, and through which to Chuderghaut the British Residency and Hyderabad city and environs there is a continual traffic,—many thousand people daily passing along. But, up to the date of this communication, there has only been a single case reported from James' bazaar street.

21. In tracing the further progress of this disease it has to be mentioned that, on the 15th November, the day after its appearance in Secunderabad, there were two cases four miles to the south at the British Residency at Chuderghaut : but, Chuderghaut again continued free until the 23rd November, between which date and the 27th November forty-three cases and nineteen deaths occurred; and, up to the 9th January 1869, the disease continued to appear there, and 138 people have been attacked, and sixty-two have died from it within the bounds of the British Residency. The British Residency is on the left bank of the Musa river ; the city of Hyderabad is opposite it on the right bank, and cholera broke out in the city on the 24th November, viz., on the day after it had appeared in the Residency, and ten days after its occurrence in Secunderabad town. On the day there were two deaths in the city. On the 25th there were four within, and two without the city ; and in the forty days, between the 24th November 1868 and 2nd January 1869, the total deaths were 1,656. This number of deaths would indicate about 4,000 seizures. In the city and its environs on the sixth day of the outbreak, the disease seems to, have attained to its full force ; forty-two then died, and all through the month of Shaban, the daily deaths ranged from forty-two to ninety-four, the highest death rate occurring on the last day of the Shaban month. The following was the first of the Ramzan ; the deaths on that date were thirty-six, and they continued to decrease all through Ramzan month. It is known, at the date of my writing (16th January 1869) that it still continues in the city and none at Chudderghaut, but the 1868-69 epidemic has been deemed by the people of so little severity it has not caused their respective communities any agitation.* It is mentioned that in an outbreak of this disease about eleven years ago (1275 Hejira) the mortality in Hyderabad continued very heavy for about two months ;—for sometime many hundreds, it is said even up to 800 or 1,000, died daily, and before it disappeared, almost every house had lost some of its members. The remembrance of that severe affliction seems to have tempered their views as to the present outbreak, in which, perhaps, about 6,000 out of 250,000 may up to this time have been ill, and about 2,500 may have

——	Month of		
	Shaban, 24th Nov. to 15th Dec.	Ramzan, 16th Dec. to 2nd January.	Total.
Within the city walls..	197	451	648
Outside do.	983	25	1,008
Total...	1,180	476	1,656

* Cholera re-appeared in July and August, and caused a higher mortality. W. R. C.

died. If the numbers suddenly attacked in Nullagoottah be considered, the extent of its appearance in other parts of the Secunderabad Cantonment may be regarded as slight, and we are as yet seemingly ignorant of the means by which it spreads. In illustration of this it may be mentioned that daily about 700 workmen from Secunderabad assemble amongst the European barracks at Trimulgherry; but not a single case occurred amongst the European Artillery and Infantry there, and only a single case occurred amongst the resident Military bodies of this place. In Bolarum Cantonment, five miles to the north, only three cases occurred up to the present time. The western road hence to Sholapore continues free. But four cases occurred in Her Majesty's 2-21st while moving southwards towards Madras; two Regiments of the Hyderabad Contingent moved to the south and north-west in the beginning of December, and both were sufferers from it, and two Companies of Madras Sappers and Miners, which arrived here from Bangalore on the 6th January in good health, had cases amongst them from the 10th of January, and cases continued to recur till the 20th. In the village of Yapral, near Bolarum, there were twelve deaths. Three Artillery-men were brought into Bolarum from the Ramnah, and in the road side hamlet of Trimulgherry, quite close to the European Infantry, there have been five cases and four casualties.* The history of the two Regiments, which moved from Bolarum, will further show the extension of this epidemic. On the 24th November the state of this neighbourhood was such, I recommended that the march of the 3rd Cavalry and 5th Infantry Hyderabad Contingent be deferred for the present. I gave as the reasons for my recommendation that the epidemic was so generally spread over this place from Chuderghaut to Trimulgherry, that "it is, I think, almost impossible for these Corps to move hence, at present, without carrying it with them, introduced by the carriage and coolies." That recommendation was not, however, adopted. On the 27th November it was verbally mentioned to me, that these Corps would march by a detour, there being no sickness amongst them. They moved from Bolarum accordingly,—the 5th Infantry on the 30th November, and the 3rd Cavalry on the 1st December,—the Infantry southwards to Lingasoogoor, and the Cavalry to Hingolee, on the north-west, and both suffered.

*There were also in the Trimulgherry bazaar seven attacks and two deaths.

22. The first return or report of cholera reached me from the 5th Infantry on the 10th December from Janumpett, and the next on the 16th December.

The returns from this Corps show that their first case occurred on the very day they marched from Bolarum, and up to the 25th December inclusive they had, amongst the Soldiers and the followers, seventy-two attacks and thirty-two deaths.

1868.	Attacked.	Died.	1868.	Attacked.	Died.
30th Nov....	1	1	13th Dec...	5	1
2nd Dec....	3	...	14th do. ...	14	4
3rd do. ...	...	1	15th do. ...	10	7
4th do. ...	2	2	16th do. ...	6	3
5th do. ...	...	...	17th do. ...	7	2
6th do. ...	1	1	18th do. ...	2	2
7th do. ...	1	..	19th do. ...	3	...
8th do. ...	2	...	20th do. ...	1	1
9th do. ...	...	...	21st do. ...	2	1
10th do. ...	2	1	23rd do. ...	...	1
11th do. ...	4	2	25th do. ...	...	1
12th do. ...	6	1			

23. The 3rd Cavalry Hyderabad Contingent marched on the 1st December from Bolarum north-west to Hingolee. There had been one fatal case of cholera in the person of a servant in the Resident's compound, two days before they marched. But this Regiment continued well till the 9th December, on which date cholera appeared in their camp at Kurukgul, eighty miles from Secunderabad.

Eleven cases occurred at Kurukgul, and the disease continued to show itself until the 21st December on to Sindghee, 181 miles from Secunderabad, when it disappeared.

24. In the thirteen days, during which the 3rd Regiment of Cavalry had this epidemic disease, there occurred 137 cases and eighty-two deaths; amongst these, nine of the ranks had been attacked, and three had died.

With this Regiment the onset and the departure of cholera were alike sudden. The Regiment crossed the Godavery at Nandair at 6 A.M. of the 17th December. By 4 P.M. of

that day, when three miles beyond Nandair, fresh cases began to decrease, and from that date the number of attacks declined. Surgeon, Reed M.D., reports that the disease was peculiarly fatal to children and to the aged and infirm of both sexes. That in very many cases, both in adults and children, there was vomiting of round worms : that many cases rapidly proved fatal, even in 6 or 8 hours, and in these the disease was ushered in at once with Collapse and Coma, with very little vomiting and purging. He further reports that from the 9th to 17th December the weather was very close and sultry, with a peculiar misty haze on the horizon, and the wind, if any, was southerly and blew directly through their camp from rear to front. But on the 19th the wind shifted round to the north-east, and, though afterwards variable and often shifting round to the southward, there was always a fresh breeze, and the nights and mornings were cooler, though the weather generally was unusually warm.

1868.	Attacked.	Died.	1868.	Attacked.	Died.
9th Dec....	11	2	16th Dec...	14	17
10th do. ..	9	4	17th do....	5	4
11th do....	14	3	18th do....	3	3
12th do....	19	5	19th do....	3	2
13th do....	29	9	20th do....	...	3
14th do....	13	12	21st do....	...	4
15th do....	17	14			

25. The epidemic did indeed disappear from the 3rd Cavalry at Sindghee on the 21st December, twenty miles from Hingolee. But the Regiment continued to move on ; entered Hingolee on the 28th December, and, on the same date, the 1st Cavalry departed from Hingolee towards Aurungabad. Immediately after the entry of the 3rd Cavalry, one cholera case occurred in the town of Hingolee, on the 2nd January ; the 1st Cavalry also carried the disease on with them in their march to Aurungabad, for, from the 31st December to the 6th January, they had seventeen cases and four deaths.

26. I have before mentioned that on the 24th November I had written to recommend that the 3rd Cavalry and 5th Infantry should not march from Bolarum. I received a reply in a letter of the 28th December, informing me " that the 3rd Cavalry marched as directed in "General Orders. The route to Hingolee is by Puttencherroo and not in the Trimulgherry "direction. The 5th Infantry was halted at Bolarum some days and marched to Ooppul by "Mulkajgherry and thence to the Durgah avoiding Trimulgherry and Chuderghaut entirely." But, with reference to the question of non-moving of troops during the prevalence of cholera, and to that of preventing its spread, as Bolarum has continued free from cholera, there seems no doubt that the 3rd Cavalry and 5th Infantry carried the seeds of this disease with them, and it is probable that had they stayed at Bolarum they would have escaped the epidemic of cholera which attacked them on the march.

On the other hand, however, on the approach of three Companies of the 20th Regiment Native Infantry, marching northwards from Bellary through this station, I recommended that they should avoid the usual western street into this town and march on without changing baggage. They arrived here on the 26th November, and their march northward was completed free from this disease.

On the 25th November, a Jemadar's party left this Cantonment to meet and escort Ordnance stores from Madras. These stores were in 150 carts in charge of a Conductor and Serjeant and about 200 followers.

The escort met the stores 120 miles to the south of this, near Kurnool, and returned here on the 23rd December, wholly free from the disease. The Jemadar said that they had heard of a little cholera on the road as they went down, but of none as they returned. I was not aware of the movement of this escort until their return.

Similar cases have been occurring in 1868 all through Berar, from Ellichpoor on the north-east to Janiphal on the south-west, and, as an interchange of Batteries of Artillery was ordered between Ellichpore and Aurungabad, in order to make sure that their line of march was free from cholera, I recommended its postponement for a month or six weeks (No. 992 of 21st October 1868), unless urgent political or military reasons needed their removal. And, if required to move, I advised, in order to avoid contact with infected places, that the Commanding Officers should keep themselves informed as to the state of the country on their lines in advance, and should deviate from it or move on other lines as the case might need, but that no Battery should move away from its station unless men and followers were entirely free from cholera.

It was, however, deemed desirable that the move should be made as soon as possible (No. 2,629 of 23rd October), in consequence of the deficiency of water and forage at a later period, owing to the scarcity of rain. But Commanding Officers were ordered to ascertain if cholera were raging in the villages; and, if so, were authorized to delay the march until favorable reports were received. Commandants of Batteries were ordered to inquire as they proceeded to avoid encamping and deviate from the route, where cholera may have recently prevailed, and not to move away unless men and followers were entirely free from cholera.

The two Batteries moved under these instructions, and the interchange was made with immunity from cholera. These furnish instances of troops marching with safety during a cholera season.

I have since recommended that the F. Company of Madras Sappers should not move on the southern road. They, however, moved hence on the 12th January, but the result is not yet known; I trust it may be favourable.*

27. Of the four bodies of troops, whose non-movement was recommended, *viz.*, two Batteries of Artillery, a Regiment of Infantry, and one of Cavalry, all Asiatics, and all of which however marched, cholera occurred in the Infantry Regiment marching southwards to Lingasoogoor, and in the 3rd Cavalry Regiment moving north-west to Hingolee: also the 1st Cavalry marched from Hingolee on the day that the 3rd Cavalry entered it and carried the disease onwards to Aurungabad: and a letter of the 14th January intimates another case at Aurungabad. Reviewing these occurrences, my precautionary recommendations not to move seem to me correct. Though the march free from cholera of two small bodies of troops has shown that some do escape it, I think such risk marches, in time of sickness, perilous alike for the troops moving as for the inhabitants of the country through which they move. An infected Corps may communicate the disease along a great line of country, and the disease may thus continue to spread from many fresh centres, or may again and again die away and return, and in the present epedemic it returned with the G. and H. Companies of Sappers to Secunderabad. From my investigations,† I have formed the opinion that cases occur of intercommunications between both great and small bodies of troops, the one infected the other free, without cholera being taken up by the free body. But instances on the other hand do occur where there is every appearance of the disease having been propagated by infected people, or infected carriage and by intercourse between infected places, and such seems to have occurred here.

† 1849, Statistics of cholera.
1852, Are there towns in India, exempt from cholera.
1856, Localities in India exempt from cholera.
1863, Report on cholera at Thayetmyo.

28. From the 14th November to the 26th January this epidemic outbreak of cholera has caused 209 attacks and 120 deaths in the Secunderabad Cantonment.

The onset of the disease was sudden. For the first twelve days it was severe, and its decline has been prolonged. On the 14th November fourteen cases occurred: in the next six days the attacks ranged from 17 to 6. On the 21st and 22nd there were five and three attacks respectively. On the 23rd fifteen cases occurred, and on the 24th and 25th November there were eleven and fourteen attacks. Up to the 18th November the disease continued exclusively in Nallagoottah, which comprehends Macleod Goodah and Sweeper Goodah; and it then began to spread from that locality; and from the 19th November inclusive, one, two, three, four, and five cases daily have been occurring amongst the civil population of this Cantonment. The last case in the civil town was reported on the 26th December, but the disease has not yet disappeared from the Cantonment.

1868.	Attacks.	1868.	Attacks.
14th Nov........	14	20th Nov........	6
15th do.	17	21st do.	5
16th do.	11	22nd do.	3
17th do.	14	23rd do.	15
18th do.	9	24th do.	11
19th do.	11	25th do.	14
Total days...	...	12	130

29. If the ages be examined, we find as under: Out of 176 case which occurred up to the 26th December forty-three occurred amongst children from six months to twelve years of age;

* The Company marched, viâ Nundial to Cuddapah. They had no cholera, and the cholera which affected the 19th Regt. N. I., at Nonipilly near Nundial had apparently disappeared before the Sappers traversed the route.
W. R. C.

what proportions these bear to the community is not known, as the census of this population has never been taken.

In examining the comparative attacks amongst men and women seventy-seven of the 176 were amongst women and girls, of whom twenty-eight were girls of or under fourteen years of age.

Amongst the grown-up people, the greatest number of attacks in any avocation fell upon the labourers (coolies), of whom twenty-six were seized, sixteen of whom resided in Nullagoottah.

There were in all, twenty-one of the Shepherd and Cowherd castes attacked. Of those of them actually following their caste avocations of milkmen, there were fifteen (all residents of Nullagoottah) attacked between 14th and 24th November inclusive. As people working with horned cattle, it may be mentioned that seven carters were attacked, sixteen merchants were attacked, and amongst these are included the Vaisya. Their attacks occurred between the 15th November and 24th December 1868. There were ten of the Marwari people (eight men and two women) attacked ; seven beggars were also attacked.

Nullagootah	16	Regimental Bazaar ...	1
New Market.	2	Begum Pett	1
General Bazaar.	1	Grass Mundee.	1
Imam Baori	1	Big Choultry...	1
Near the Market	1	Lascars Lines...	1

Nullagoottah	3	2nd Bazaar...	1
General Bazaar	3	Near Chuderghat... ...	1
Big Choultry	3	Market Bazaar...... ...	1
Bmam Baori	2	Regimental Bazaar ...	1
Lascar Lines	1		

If these numbers be brought together, they show as under, out of 176 attacks :—

Children half a year to twelve years old....	43
Labourers...	26
Merchants...	16
Milkmen (Gaoli, Dhangar.)...	15
Carters......	7
Beggars......	7

In this Military camp town the caste of an individual does not indicate his profession or standing, and knowledge as to the castes thereof cannot, so far as can be seen, be of any use ; but I place on the margin the castes of those 176 attacks.

Tilling Soodras...	48	Pariahs	20
Arava or Tamil...	6	Marwari...	10
Maharatta Soodras... ...	9	Brahmin...	3
Gaoli and Dhangar... ...	21	Chucklar...	16
Mahomedans	42	Parsee	1

30. I place on the margin* the daily mean of the meteorological observations for November and December. The disease appeared on the 13th and 14th November, up to which date the record was unaltered. From the 15th November to the 25th November the day ozone decreased to one-half, and the night ozone record also fell below the average. But there were other periods when it was higher. I do not observe in the meteorological register any thing worthy of note, but I give the record on the margin."

DAILY MEMO. OF OBSERVATIONS FOR 1868.

Dates	November. Atmospheric pressure.	November. Temperature.	November. Ozone. Night.	November. Ozone. Day.	December. Atmospheric pressure.	December. Temperature.	December. Ozone. Night.	December. Ozone. Day.	Dates.	November. Atmospheric pressure.	November. Temperature.	November. Ozone. Night.	November. Ozone. Day.	December. Admospheric pressure.	December. Temperature.	December. Ozone. Night.	December. Ozone. Day.
1	28·050	79·8	5	3	28·058	73·3	5	3	17	28·100	76·	2	3	28·100	72·	3	2
2	28·058	80·2	5	3	28·075	71·4	4	2	18	28·100	76 5	2	1	28·100	73·3	3	1
3	28 075	80·3	5	3	28·091	72·5	3	2	19	28 058	75 2	2	1	28·075	74	3	2
4	28·075	79·6	4	2	28·083	72 1	3	2	20	28·050	74·	2	1	28·075	73·	2	1
5	28·008	77·1	4	2	28·091	72·5	3	2	21	28·050	74·5	3	1	28 050	73·9	3	1
6	28·008	78·5	3	1	28 091	72·3	3	2	22	28·058	73·6	2	1	28·041	74·0	2	1
7	27·958	76·1	3	2	28 075	71·1	4	3	23	28·058	74·5	2	1	28·041	74 5	3	2
8	27·975	76·	3	2	28·058	70·8	4	2	24	28 075	74·5	2	1	28·025	74·9	4	2
9	27·975	77·2	4	3	28 058	71 6	2	1	25	28·083	73·5	2	1	28·033	74·5	3	1
10	27·975	77·	4	3	28 050	75·7	3	1	26	28·066	73·8	2	2	28 033	73·8	3	1
11	27·975	77·1	4	2	28·025	73·7	3	2	27	28·083	72·6	4	3	28·050	73·5	3	2
12	28·012	79·1	3	2	28·016	75·	3	2	28	28·075	74·7	2	1	28 050	74·5	4	2
13	28·008	76 6	4	2	28·016	75·	3	2	29	28·091	73·5	3	4	28·058	75·	3	1
14	28·025	76·	3	1	28·033	74·3	3	1	30	28·066	73·4	4	3	28·033	75·3	2	1
15	28·025	76·7	3	1	28·066	73·5	2	1	31	......	...	..	...	28 058	75·1	2	1
16	28 075	76·3	2	2	28·100	72·	3	2									

(True Extract.)

W. R. CORNISH, F.R.C.S., Surgeon,
Sanitary Commissioner.

APPENDIX II.

Government Meteorological Register kept at Kurnool, during the half-month, January 1st to 15th, 1869.

Day of		Standard Barometer 50 Browning Reduced to 32.						Dry Bulb Thermometers in Shade.										Wet Bulb Thermometers in Shade							Humidity by Madras Tables.			
Month.	Week.	Deduced Range.	Reduced Readings +0·044.			Correction for Hours.	Reduced Daily Mean.	Maximum.		Daily Range.	Minimum.		Corrected Dry Bulb.			Correction for Hours.	Reduced Daily Mean.	Minimum.		Corrected Wet Bulb.			Correction Hours.	Reduced Daily Mean.	At Hours of Observation.			From Daily, Means.
			10 A.M.	4 P.M.	10 P.M.			Corr.	True.		Corr.	True.	10 A.M.	4 P.M.	10 P.M.			Corr.	True.	10 A.M.	4 P.M.	10 P.M.			10 A.M.	4 P.M.	10 P.M.	
Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Jan.	1869.	Ins.	Inches.	Inches.	Inches.	Inches.	Inches.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	Cts.	Cts.	Cts.	Cents.
1	Fri.	0·150	29·165	29·022	29·122	—0·017	29·086	—1·4	88·5	23·0	—0·5	65·5	80·7	84·6	75·1	—0·5	76·0	+3·9	64·0	72·9	73·7	69·2	0·0	70·0	69	60	74	74
2	Sat	0·168	29·189	29·029	29·136	—0·018	29·100	—2·1	91·4	24·5	—0·3	66·9	80·6	89·6	75·7	—0·5	77·7	+3·9	66·4	72·2	76·6	69·9	0·0	71·3	67	56	75	73
3	Sun.	0·153	29·200	29·054	29·181	—0·017	29·128	—1·1	92·1	25·1	—0·2	67·0	82·7	89·3	74·4	—0·5	77·9	+3·9	64·8	72·9	75·6	69·9	0·0	70·1	63	54	67	68
4	Mon.	0·184	29·237	29·062	29·153	—0·020	29·131	—1·4	90·5	27·8	—0·8	62·7	82·0	88·7	72·9	—0·6	76·0	...	59·9	69·8	74·7	66·8	0·0	67·8	54	52	73	66
5	Tues.	0·167	29·164	29·005	29·118	—0·018	29·078	—1·6	92·5	29·3	—0·3	63·2	82·7	91·5	73·6	—0·6	77·2	...	61·5	67·4	72·8	65·3	0·0	66·8	45	41	64	58
6	Wed.	0·167	29·183	29·024	29·153	—0·018	29·102	—2·1	92·5	28·5	—0·3	64·0	82·6	91·8	73·9	—0·6	77·5	...	61·8	69·0	67·1	64·4	0·0	65·6	50	26	59	53
7	Thur.	0·159	29·188	29·037	29·143	—0·017	29·106	—1·3	91·6	27·2	—0·2	64·4	82·5	90·1	77·9	—0·5	78·2	...	61·0	67·7	69·6	67·2	0·0	66·4	46	35	57	54
8	Fri.	0·155	29·181	29·033	29·107	—0·017	29·090	—0·6	92·5	25·1	—0·3	67·4	84·2	89·1	77·7	—0·5	79·1	...	64·9	70·6	70·9	68·1	0·0	68·6	51	41	61	58
9	Sat.	0·163	29·177	29·022	29·112	—0·018	29·086	—1·4	92·3	24·6	—0·2	67·7	83·9	90·6	76·6	—0·5	79·2	+3·0	65·1	72·1	71·6	65·9	0·0	68·7	57	39	57	58
10	Sun.	0·172	29·181	29·017	29·120	—0·019	29·087	—1·1	91·4	25·5	—0·3	65·9	82·7	89·0	75·6	—0·5	77·8	+3·5	62·6	71·8	71·7	65·6	0·0	67·9	59	45	59	60
11	Mon.	0·177	29·202	29·033	29·133	—0·019	29·104	—1·2	88·7	21·4	—0·3	67·3	80·6	88·7	74·9	—0·4	77·5	+3·6	65·5	71·3	72·1	66·7	0·0	68·9	63	45	65	65
12	Tues.	0·156	29·200	29·051	29·145	—0·017	29·115	—1·0	87·7	22·6	—0·2	65·1	77·7	84·9	72·6	—0·5	74·6	+3·7	64·0	68·0	69·5	63·8	0·0	66·3	61	46	62	65
13	Wed.	0·173	29·216	29·051	29·133	—0·019	29·114	—1·0	87·6	26·3	—0·5	61·3	78·6	86·9	71·9	—0·5	74·2	+3·7	60·4	68·9	70·9	63·9	0·0	66·0	61	45	65	65
14	Thur.	0·161	29·216	29·063	29·137	—0·018	29·121	—1·6	90·4	28·7	—0·3	61·7	81·9	88·6	73·6	—0·6	75·9	+3·7	57·6	66·6	71·7	65·7	0·0	65·4	44	44	66	56
15	Fri.	0·154	29·277	29·129	29·208	—0·017	29·188	—0·8	88·6	27·1	—0·1	61·5	79·9	86·7	71·9	—0·5	74·5	+3·8	59·9	69·1	71·6	63·8	0·0	66·1	58	48	65	64
Sums ...		2·459	437·976	435·632	437·101	0·269	436·636	19·7	1358·3	386·7	4·8	971·6	1223·3	1330·1	1118·3	7·8	1153·3	36·7	939·4	1050·3	1080·1	993·2	0·0	1015·9	848	677	969	937
Means ..		0·164	29·198	29·042	29·140	—0·018	29·109	—1·3	90·6	25·8	—0·3	64·8	81·6	88·7	74·6	—0·5	76·9	+3·7	62·6	70·0	72·0	66·2	0·0	67·7	57	45	65	62

APPENDIN II.—(*Continued.*)

*North Latitude*__________ *East Longitude*__________ *Hight of Barometer Cistern above Sea Level*__________*feet.* *Direct Distance from Sea*__________*miles.*

Day of		Radiation Thermometers.						Wind.							Rain	Ozone.			Clear Sky				Clouds, Weather, and other Remarks.		
		Maximum in Sun.				Minimum on Grass.		Velocity.			Direction.								Up to			Mean.	For the abbreviations employed *see* "Instructions to Observers."		
Month	Week.	In Vacuo.		Freely Exposed.											Up to 10 P.M.	10 A.M.	10 P.M.	Mean.							
		Corr.	True.	Corr.	True.	Corr.	True.	10 A.M.	10 P.M.	Daily.	10 A.M.	10 P.M.	Daily Mean.						10 A.M.	4 P.M.	10 P.M.		Before 10 A.M.	10 A.M. to 4 P.M.	4 to 10 P.M.
Column.		28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
Jan.	1869.	°	°	°	°	°	°	Miles.	Miles.	Miles.	Points	Points	Points.	Nautical.	Inches	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.			
1	Fri.	...	130·4	...	...	+1·2	55·7	26	70	96	10	11	10	E. S. E.	...	30	10	20	70	40	90	67	Fine w. p. clouds.	Passing clouds.	Fine.
2	Sat.	...	127·7	...	...	+1·1	59·9	33	89	122	8	11	10	E. S. E.	...	30	20	25	90	95	100	95	Fine ...	Fine ...	Clear.
3	Sun.	...	129·7	...	...	+1·4	57·8	44	103	147	10	9	10	E. S. E.	...	30	20	25	100	90	100	97	Clear ...	Do. ...	Do.
4	Mon.	...	128·8	...	...	+1·1	51·3	45	138	183	10	11	10	E. S. E.	...	50	20	35	100	100	100	100	Do. ...	Clear ...	Do.
5	Tues.	...	129·7	...	...	+1·0	53·0	14	52	66	10	11	10	E. S. E.	...	30	20	25	100	100	100	100	Do. ...	Do. ...	Do.
6	Wed.	...	129·8	...	...	+1·3	54·2	14	94	108	15	9	12	S. E.	...	30	10	20	100	100	100	100	Do. ...	Do. ...	Do.
7	Thur.	...	128·9	...	...	+1·2	54·3	28	105	133	17	15	16	S.	...	50	20	35	95	90	95	93	Fine ...	Fine ...	Fine.
8	Fri.	...	129·5	...	...	+1·4	59·0	32	52	84	15	12	14	S. S. E.	...	30	10	20	95	70	95	87	Do. ...	Fine w. p. clouds.	Do.
9	Sat.	...	130·2	...	...	+1·0	59·6	3	41	44	10	10	10	E. S. E.	...	50	20	35	95	90	95	93	Do. ...	Fine ...	Do.
10	Sun.	...	132·8	...	...	+1·2	57·4	6	83	89	10	9	10	E. S. E.	...	50	20	35	90	70	100	87	Do. ...	Fine w. p. clouds.	Clear.
11	Mon.	...	128·4	...	...	+1·1	57·0	45	135	180	9	10	10	E. S. E.	...	50	30	40	95	90	100	95	Do. ...	Fine ...	Do.
12	Tues.	...	127·7	...	...	+...	56·4	85	85	170	12	9	10	E. S. E.	...	50	20	35	95	95	95	95	Do. ...	Do. ...	Fine.
13	Wed.	...	127·8	...	...	+1·1	51·9	70	40	110	10	8	9	E. by S.	...	50	20	35	95	70	95	87	Do. ...	Fine w. p. clouds.	Do.
14	Thur.	...	129·9	...	...	+1·1	48·2	28	65	93	9	9	9	E. by S.	...	50	20	35	100	100	100	100	Clear ...	Clear ...	Clear.
15	Fri.	...	128·2	...	...	+1·5	51·7	47	143	190	11	9	10	E. S. E.	...	30	20	25	100	100	100	100	Do. ...	Do. ...	Do.
Sums.		...	1939·5	...	...	16·7	827 4	520	1,295	1,815	166	153	160	......	...	610	280	445	1,420	1,300	1,465	1,396	...	...	...
Means.		...	129·3	...	...	+1·2	55·2	35	86	121	11	10	11	S.E.byE.	0·00	41	19	30	95	87	98	93	...	...	...

APPPENDIX II.—(*Continued.*)

Government Meteorological Register kept at Kurnool, during the half-month, January 16th to 31st, 1869.

Day of: Month.	Day of: Week.	Standard Barometer 50 Browning reduced to 32°: Deduced Range.	Reduced Readings +0·044: 10 A.M.	Reduced Readings +0·044: 4 P.M.	Reduced Readings +0·044: 10 P.M.	Correction for Hours.	Reduced Daily Mean.	Dry Bulb Thermometers in Shade: Maximum: Corr.	Maximum: True.	Daily Range.	Minimum: Corr.	Minimum: True.	Corrected Dry Bulb: 10 A.M.	Corrected Dry Bulb: 4 P.M.	Corrected Dry Bulb: 10 P.M.	Correction for Hours.	Reduced Daily Mean.	Wet Bulb Thermometers in Shade: Minimum: Corr.	Minimum: True.	Corrected Wet Bulb: 10 A.M.	Corrected Wet Bulb: 4 P.M.	Corrected Wet Bulb: 10 P.M.	Correction for Hours.	Reduced Daily Mean.	Humidity by Madras Tables: At Hours of Observation: 10 A.M.	At Hours of Observation: 4 P.M.	At Hours of Observation: 10 P.M.	From Daily Means.
Column.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Jan.	1869.	Incs.	Inches.	Inches.	Inches.	Inches.	Inches.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	Cts.	Cts.	Cts.	Cts.
16	Sat.	0·201	29·258	29·065	29·158	—0·022	29·138	—0·8	88·7	26·4	—0·6	62·3	79·0	86·7	73·1	—0·3	75·0	...	60·0	70·1	73·7	66·6	0·0	67·6	64	54	71	68
17	Sun.	0·190	29·216	29·033	29·123	—0·021	29·103	—1·2	87·4	23·9	—0·5	63·5	79·0	86·6	73·2	—0·2	75·4	+3·4	62·4	70·1	72·2	65·2	0·0	67·5	64	50	65	66
18	Mon.	0·158	29·152	29·000	29·118	—0·017	29·073	—1·1	88·8	24·9	—0·2	63·9	78·7	87·6	73·7	—0·2	75·8	+4·3	62·1	70·3	72·7	64·6	0·0	67·4	66	49	62	65
19	Tues.	0·175	29·165	28·997	29·117	—0·019	29·074	—1·0	89·2	28·4	—0·2	60·8	78·7	88·0	71·5	—0·3	74·5	+3·9	58·8	69·7	71·9	63·1	0·0	65·9	64	47	63	64
20	Wed.	0·181	29·199	29·025	29·124	—0·020	29·096	—0·8	89·1	29·1	—0·3	60·0	76·9	87·4	72·1	—0·3	73·8	+3·6	58·5	67·9	72·4	64·6	0·0	65·9	63	48	67	66
21	Thur.	0·207	29·196	28·997	29·100	—0·023	29·075	—0·7	90·1	30·3	—0·1	59·8	78·6	89·1	74·6	—0·3	75·2	+4·0	57·5	68·1	73·9	67·0	0·0	66·6	58	50	67	64
22	Fri.	0·198	29·143	28·953	29·042	—0·022	29·024	—1·1	91·6	29·0	—0·2	62·6	80·6	89·3	75·1	—0·3	76·6	+3·7	58·3	67·9	73·7	66·9	0·0	66·7	52	49	65	59
23	Sat.	0·152	29·058	28·912	29·022	—0·017	28·980	—0·6	91·2	26·4	—0·5	64·8	80·7	88·7	73·1	—0·3	76·5	+4·0	62·0	67·9	74·1	64·9	0·0	67·2	52	51	64	66
24	Sun.	0·162	29·077	28·921	29·009	—0·018	28·984	...	91·6	28·1	—0·8	63·5	80·3	90·8	74·9	—0·3	77·1	...	60·0	72·1	75·2	64·9	0·0	68·1	67	49	58	64
25	Mon.	0·162	29·073	28·917	29·016	—0·018	28·984	—1·1	91·6	26·1	—0·2	65·5	80·2	88·5	77·1	—0·3	77·6	...	62·4	67·7	68·2	65·4	0·0	65·9	52	35	53	55
26	Tues.	0·152	29·087	28·939	29·009	—0·017	28·995	—1·7	93·6	26·0	—0·1	67·6	80·0	90·6	78·6	—0·3	78·9	...	63·5	68·3	69·9	66·7	0·0	67·1	55	36	53	55
27	Wed.	0·151	29·075	28·928	29·015	—0·017	28·989	—1·0	93·7	26·6	—0·2	67·1	83·6	92·5	75·4	—0·3	79·4	+2·9	65·9	70·9	69·2	64·2	0·0	67·6	54	31	54	56
28	Thur.	0·142	29·099	28·961	29·008	—0·016	29·007	—1·0	93·5	25·5	—0·5	68·0	80·9	91·8	78·8	—0·3	79·6	+3·7	64·2	70·9	73·3	68·9	0·0	69·3	61	42	60	59
29	Fri.	0·147	29·085	28·942	28·990	—0·016	28·990	—1·1	95·6	25·6	—0·8	70·0	84·5	91·6	79·0	—0·3	81·0	+3·9	65·4	73·2	74·1	68·1	0·0	70·2	58	45	58	60
30	Sat.	0·176	29·084	28·913	29·000	—0·019	28·980	—1·6	97·6	26·2	—0·8	71·4	84·1	94·8	80·9	—0·3	82·5	+3·6	67·6	75·1	76·4	71·6	0·0	72·7	66	44	64	64
31	Sun.	0·158	29·071	28·918	29·012	—0·017	28·983	—1·5	99·6	36·0	—0·2	73·6	88·2	96·9	84·6	—0·2	85·6	...	67·7	74·6	77·1	72·5	0·0	73·0	54	41	56	56
Sums ...		2·712	466·038	463·421	464·863	0·299	464·475	16·3	1472·9	428·5	6·2	1044·4	1291·0	1440·9	1215·7	4.5	1244·4	41·0	996·3	1124·8	1168.0	1065·2	0·0	1088·7	949	721	980	983
Means ...		0·170	29.127	28·964	29·054	—0·019	29·030	—1·1	92·1	26·8	—0·4	65·3	80·7	90·1	76.0	—0·3	77·8	+3·7	62 3	70·3	73·0	66·6	0·0	68·0	59	45	61	61

APPENDIX II.—(*Concluded.*)

North Latitude ______ *East Longitude* ______ *Height of Barometer Cistern above Sea Level* ______ *feet. Direct Distance from Sea* ______ *miles.*

Day of		Radiation Thermometers.						Wind.							Rain.	Ozone.			Clear Sky.				Clouds, Weather and other Remarks.		
		Maximum in Sun.				Minimum on Grass.		Velocity.			Direction.				Up to 10 P.M.	10 A.M.	10 P.M.	Mean.	Up to			Mean.	For the abbreviations employed *see* "Instructions to Observers."		
Month	Week.	In Vacuo.		Freely Exposed.																					
		Corr.	True.	Corr.	True.	Corr.	True.	10 A.M.	10 P.M.	Daily.	10 A.M.	10 P.M.	Daily Mean.						10 A.M.	4 P.M.	10 P.M.		Before 10 A.M.	10 A.M. to 4 P.M.	4 to 10 P.M.
Column.		28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
Jan.	1869.	°	°	°	°	°	°	Miles.	Miles.	Miles.	Points	Points	Points	Nautical	Inches	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.			
16	Sat.	...	126·7	...	...	+0·9	52·9	37	102	139	9	10	10	E. S. E.	...	50	50	50	100	95	100	98	Clear ...	Fine ...	Clear.
17	Sun.	...	125·7	...	...	+1·1	53·9	48	43	91	11	8	10	E. S. E.	...	50	30	40	70	30	95	65	Fine w. p. clouds.	Passing clouds	Fine.
18	Mon.	...	128·3	...	..	+1·4	53·7	4	98	102	7	14	11	E. S. E.	...	30	20	25	90	95	100	95	Fine ...	Fine ...	Clear.
19	Tues.	...	128·3	...	...	+1·2	50·0	43	103	146	14	10	12	S. E.	...	50	20	35	100	100	100	100	Clear ...	Clear ...	Do.
20	Wed.	...	127·5	...	...	+1·1	51·2	103	107	210	10	11	11	E. S. E.	...	50	20	35	100	100	100	100	Do. ...	Do. ...	Do.
21	Thur.	...	130·2	...	...	+1·3	49·5	76	91	167	10	11	11	E. S. E.	...	50	20	35	100	95	100	98	Do. ...	Fine ...	Do.
22	Fri.	...	130·7	...	...	+1·1	52·2	44	41	85	10	7	8	E.	...	30	20	25	100	50	70	73	Do. ...	Passing clouds	Fine w.p. clouds.
23	Sat.	...	130·8	...	...	+1·1	55·2	39	33	72	10	13	12	S. E.	...	50	30	40	30	50	95	58	Passing clouds.	Do....	Fine.
24	Sun.	...	133·2	...	...	+0·7	55·1	41	30	71	14	10	12	S. E.	...	30	10	20	70	95	95	87	Fine w. p. clouds.	Fine ...	Do.
25	Mon.	...	132·2	...	...	+1·2	57·4	22	21	43	25	6	32	N.	...	50	20	35	95	50	90	78	Fine ...	Passing clouds	Do.
26	Tues.	...	132·2	...	...	+1·5	59·4	37	18	55	22	14	18	S. S. W.	...	50	20	35	70	50	70	63	Fine w. p. clouds.	Do....	Fine w. p. clouds.
27	Wed.	...	133·6	...	...	+1·3	60·2	55	105	160	11	11	11	S.E.byE.	...	30	20	25	95	100	100	98	Fine ...	Clear ...	Clear.
28	Thur.	...	133·4	...	...	+1·2	61·2	76	51	127	12	10	11	S.E.byE.	...	50	20	35	100	70	100	90	Clear ...	Fine w. p. clouds.	Do.
29	Fri.	...	140·7	...	...	+0·9	63·4	47	19	66	21	15	18	S. S. W.	...	30	10	20	100	70	100	90	Do. ...	Do. ...	Do.
30	Sat.	...	137·1	...	...	+1·1	65·6	23	37	60	21	31	26	W. N. W.	...	30	10	20	100	90	100	97	Do. ...	Fine ...	Do.
31	Sun.	...	140·2	...	...	+1·6	66·2	54	26	80	22	11	16	S.	...	30	10	20	100	70	70	80	Do. ...	Fino w. p. clouds.	Fine w. p. clouds.
Sums...		...	2110·8	...	...	18·7	907·4	749	925	1,674	229	192	226	......	0·00	660	330	495	1,420	1,210	1,485	1,370	......	......	......
Means...		...	131·9	...	...	+1·2	56·7	47	58	105	14	10	12	S. E.	0·00	41	21	31	89	76	93	86	......	......	......

APPENDIX III.

Report on the out-break of cholera in the 45th Regiment stationed at Fort Saint George, during the month of September 1869, *by* DR. FINNEMORE, *Surgeon 45th Regiment.*

Till the month of June 1869, Madras was free from cholera or any other epidemic. At the beginning of the above month cholera commenced to prevail more or less in different parts of the town. It was supposed to be imported from some out-station, as it prevailed at Bellary and other stations previous to its breaking out here, and what seems to confirm this supposition is, that it first appeared, at what may be termed, a carman's stage, where carts coming in from the country halted. In the enclosure of this place was a tank used by the carters and others for washing their persons after defecation and also their clothes. From the end of February till September the weather was oppressively hot, a hot land wind blowing nearly all that time. During the latter end of May and commencement of June an unhealthy wave seemed to be passing over Madras which was, at the time, attributed to the mud banks of the filthy river Cooum being left uncovered by the long continued drought. Sores and ulcers in the General Hospital assumed a glazed unhealthy appearance, and the stumps of amputated limbs became sloughy and gangrenous. Cholera then broke out in various parts of Madras. At my request the Commanding Officer issued orders that the men were not to go near any of the infected districts, and Captains of Companies were told not to give night passes to their men. There was no diarrhœa or bowel complaints among the men, women, or children in the Fort during the time cholera prevailed in the town, and the men were tolerably healthy as the following table will shew :—

	Strength.	Daily sick.
July	753·20	40·53
August	751·50	44·67
September	663·50	35·21

The first case of cholera that broke out in the Fort was, to all appearance, a sporadic one. Private Wingrave of the band, letter E range, and in an upstairs room facing the sea, was taken ill on the morning of the 3rd of August. He had played as usual at the band stand on the beach on the evening of the 2nd. He did not complain, but his comrades noticed that he looked pale and weak. About 4 o'clock in the morning he was taken ill with a most virulent attack of cholera, he appeared to be struck down at once, there was scarcely any purging or vomiting, he was collapsed from the first and died after ten hour's illness. I learned after his death that he had been in the habit of visiting an East Indian woman who lived in or close to the infected district, but had not been out of barracks for days previous to his attack. The room in which he was taken ill was immediately cleared of the rest of the men, the clothes that were in any way contaminated with choleraic discharges were burned, the floors washed and strewed with lime and McDougall's powder, the walls lime-washed and the wood-work painted. No further cases occurred among the Bandsmen who ocupied the room. There were no further cases till the 7th of September. On the 6th, there was a heavy fall of rain but of short duration, after which the hot wind commenced again to blow, quickly drying up the moisture, making the weather feel steamy and hot. On the morning of the 7th, Private Driscoll, K Company, who lived in a down-stairs room at the same end of the barracks, but some distance from the room where the Bandsman was taken ill, was attacked. He was drunk on the evening of the 6th, lay out in the verandah of the barrack room, and got wet through by a passing shower. He was brought to the Hospital in the morning suffering from the same malignant type of cholera, he sank at once into a state of collapse from which it was impossible to rouse him. He died after seven hours illness. The next case occurred on the 8th, but at a different end of Barracks. Private Andrews who formerly led an intemperate life, but latterly had reformed, was attacked : he lived in an upstairs room which was greatly over-crowded, owing to a Detachment of men from Burmah having been put into

it, notwithstanding that the Deputy Inspector General and myself protested against any more men being sent into the Fort, which if anything was too overcrowded, taking into consideration the intense heat of the weather. Some of those men from Burmah came from a Regiment that had recently suffered from cholera, and it was not till a day or two after their arrival that cholera became epidemic in the Fort. With the exception of two men Andrews and O'Keefe who came from D Range, which is situated at the north end of the barracks, the remainder of the cholera cases came from I and K Companies that occupied rooms at the south end.* O'Keefe, who came from D Range, I learned kept a native woman in a filthy street in Black Town, and who occasionally brought him extra meals to barracks. Some of his comrades stated that early in the morning before he was attacked, he was seen eating out of the same vessel with her.

Nothing could be found out as to how the other men contracted the disease ; they would not tell whether they had been in an infected district, being afraid of punishment, as there was a stringent order that the men were not to go into any part of the native town. With one or two exceptions the men were leading an intemperate life at the time they were attacked, or had recently done so, and were consequently in a more or less debilitated state. The rooms, in which I and K Companies were quartered, are as far as ventilation is concerned, the worst in the Fort ; their floors are but slightly raised from the ground. The quarters above them are built on arches, the pillars of which, block up the lower rooms, obstructing the free ventilation. No foul drain nor want of sanitation could account for the out-break in that particular part of the barracks.

There can be no proper isolation from the native population during an out-break of cholera as long as beggars and idlers of all sorts are permitted to come into the Fort.

Attached is a list of the men who died at Head Quarters and at Palaveram, and those who recovered.

Date.	Names of men.	Company.	Range.	Habits.	Upstairs or Downstairs.	Died at Head Quarters
3rd August.	Private Wingrave.	J.	E.	Temperate. ...	Upstairs ...	Kept a woman in Black town but had not been out of barracks for three days previous to attack.
7th Sep.......	Do. Driscoll ...	K.	O.	Generally temperate.	Downstairs.	Slept in verandah and got wet, night of attack drunk before going to bed.
8th do. ...	Do. Andrews.	F.	D.	Latterly temperate.	Upstairs ...	Nil.
9th do. ...	Do. Short... ...	J.	M.	Intemperate.	Downstairs.	Nil.
11th do. ...	Do. O'Keefe ...	F.	D.	Generally intemperate.	Upstairs ...	Kept a black woman and was seen eating out of same vessel with her, the morning of attack.
						Died.
9th September	Corporal Clarke ...	J.	M.	Temperate ...	Downstairs.	Detachment sent to Palaveram from infected rooms.
9th do. ...	Private Ross... ...	K.	O.	Intemperate...	Do.	
9th do. ...	Do. Dickinson..	K.	H.	Very do. ...	Do.	
9th do. ...	Do. Staines ...	K.	H.	Temperate ...	Do.	
9th do. ...	Do. Pollard ..	J.	M.	Generally do.	Do.	
9th do. ...	Do. French ...	K.	H.	Temperate ...	Do.	

* From Dr. Finnemore's table it will be seen that three of the men who recovered came for the D Barrack which had been over-crowded.—[W. R. C.]

Date.	Name of men.	Company.	Range.	Habits.	Upstairs or Downstairs.	Recovered.
10th September	Corporal Clarke ...	J.	M.	Temperate ...	Downstairs.	Brother to Lance corporal who died.
11th do. ...	Private Coulton ...	F.	D.	Intemperate.	Upstairs ...	Nil.
11th do. ...	Do. Patient ...	F.	D.	Do. ..	Do. ...	Do.
11th do. ...	Do. T. Coomors	F.	D.	Do. ..	Do. ...	Do.

APPENDIX IV.

Cholera Statistics of European Troops at Palaveram from 1848 *to* 1869.

Years.	Corps or Detachment.	Strength.	Admissions from cholera.	Deaths from cholera.	Remarks.
1848	Euro. Arty. V. Compy.	111	...	...	
1849	Do.	116	...	...	
1850-51	Do.	151	...	...	
1851-52	Do.	158	...	...	
1852-53	Do.	155	2	2	One of these cases was taken ill after return from Madras.
1853-54	Do.	155	2	2	Cholera was epidemic in 1853—a Serjeant returning from Arcot contracted the disease on the road—a few cases occurred in the bazaar. The second case appears to have been cholera biliosa.
1854-55	Do.	180	...	...	
1855-56	Do.	173	...	...	
1856-57	Do.	142	...	...	
1857-58	Do.	58	...	...	In this year cholera was bad at Saint Thomas' Mount and a family fled from that station to Palaveram to escape it. There were five cases and four deaths of children.
1858-59	Do.	50	...	...	
1859-60	Do.	101	2	2	One of these cases had contracted cholera in Madras—of the other there is no record.
1860	Do.	98	3	2	In 1860 a Detachment of Her Majesty's 43rd Regiment in marching out from Madras to Palaveram got cholera, and two men died. The disease attacked three men of the Veteran Company, of whom two died.
1861	Do.	123	2	1	
1862	Do.	109	...	...	
1863	Do.	106	...	...	
1864	Do.	117	1	...	This case appears to have been erroneously entered as cholera, it being diarrhœa, consequent on hepatic abscess.
1865	Do.	122	1	...	A woman died of cholera after returning from Madras where it prevailed.
1866	Do.	135	1	1	This death appears to have resulted from an over-dose of Morison's pills, more than from cholera.
1867	Do.	183	...	...	
1868	Do.	174	...	...	
1869	Do.	206	...	...	
	Total...	2923	14	10	
	Proportion, per mille of cholera admissions & deaths of the European Army, for the same period.		8·1	3·8	
	Do. do. of troops at Palaveram.		4·7	3·4	

NOTE.—The average strength of European Women and Children has ranged from 400 to 800 per annum.

APPENDIX IV.—(*Continued.*)

Cholera Statistics of Native Troops at Palaveram from 1826 *to* 1869.

Years.	Corps or Detachment.	Strength.	Admissions from cholera.	Deaths from cholera.
1826	2nd Regiment N. I.	971	*3	2
	21st do.	1017	1	...
	33rd do.	1054	...	...
	35th do.	1159	...	...
1827	2nd do.	990	...	...
	4th do.	1039	...	...
	21st do.	1055	...	...
	33rd do.	1021	1	...
1828	2nd do.	906	2	1
	4th do.	904	1	1
	21st do.	946	...	...
	46th do.	935	6	1
1829	2nd do.	871	2	2
	4th do.	875	2	2
	23rd do.	966	...	...
	46th do.	910	...	...
	29th do.	933	2	1
1830	4th do.	734	2	...
	23rd do.	790	...	...
	32nd do.	873	1	1
	46th do.	812	...	...
	29th do.	876	...	...
1831	23rd do.	833	...	...
1832	19th do.	722	1	...
	29th do.	855	...	...
1833	5th do.	867	1	...
	27th do.	864	...	...
	Det. 29th do.	156	...	...
	19th do.	836	2	...
	Det. Sapp. Miners.	57	...	...
1834	29th Regiment N. I.	874	†6	4
	46th do.	832	...	...
	48th do.	868	...	...
1835	18th do.	842	...	...
	29th do.	835	...	...
	Det. 18th Regt. N. I.	119	...	...
1836	45th Regiment N. I.	852	...	...
	6th do.	859	1	...
1837	16th do.	842	...	...
1838	16th do.	868	...	...
	Carried forward...	33,612	34	15

Years.	Corps or Detachment.	Strength.	Admissions from cholera.	Deaths from cholera.
	Brought forward...	33612	34	15
1839	24th Regiment N. I.	1000	...	...
	37th do.	901	1	...
	13th do.	773	...	...
1840	37th do.	1046	...	...
	12th do.	547	...	...
1841	40th do.	953	...	...
1842	36th do.	1061	...	...
	40th do.	1180	...	...
1843	6th do.	932	...	...
	44th do.	712	1	1
1844	44th do.	1175	...	...
	41st do.	480	...	...
1845	41st do.	1008	1	1
1846	....	...	...	...
1847	52nd do.	962	...	...
1848	....	...	...	...
1849	....	...	...	...
1850-51	Det. 50th do.	464	...	...
1851-52	50th do.	854	...	...
1852-53	....	...	...	...
1853-54	....	...	...	...
1854-55	Nat. Infty. Depôt ...	332	...	...
1855-56	do.	531	...	...
1856-57	do.	460	1	...
1857-58	do.	...	...	...
1858-59	do.	527	1	1
1859-60	do.	1238	...	...
1860	Native Recruits ...	63	1	...
	Nat. Infty. Depôt ...	428	...	...
1861	23rd do. ...	489	...	...
	Nat. Infty. Depôt ...	360	...	...
1862	do.	372	1	...
1863	do.	131	...	...
1864	do.	156	...	...
1865	do.	184	2	1
1866	do.	196	1	...
1867	do.	160	...	...
1868	do.	198	...	...
1869	do.	115	...	...
	Total...	53,600	44	19
	Proportion per mille of cholera admissions & deaths in the Native Army for the same period.		10·9	4·7
	Do. of Native Troops at Palaveram. ...		0·8	0·3

* There is no history as to where these cases occurred whether on the line of march or in Palaveram. The Regiments stationed at Palaveram formerly sent detachments to Madras and many of the deaths probably occurred in consequence of these moves to an endemic locality.

† These cases occurred immediately after arrival at the station, the Regiment having been attacked on the march.

APPENDIX V.

Table showing the Total Deaths and Mortality from Cholera in the several Districts and Municipalities in the Madras Presidency during 1869.

Districts.	Population of Villages from which Returns were received.	Total deaths.	Cholera deaths.	Ratio per 1,000 of Population.		Months of prevalence of Cholera.											
				Total Deaths.	Cholera Deaths.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Ganjam District ...	1,068,992	16,437	981	15·3	0·9	17	14	58	55	25	160	299	199	109	9	16	20
M. T. Chicacole ...	14,686	277	12	18·8	0·8	...	...	...	...	...	1	...	5	2	2	2	...
M. T. Berhampore.	20,570	300	40	14·5	1·9	...	2	...	...	...	13	18	6	1	...	...	...
Vizagapatam District.	1,079,926	22,226	567	20·5	0·5	26	6	11	10	13	37	185	122	72	53	28	4
M. T. Vizagapatam.	16,867	619	5	36·6	0·2	...	...	...	...	...	...	5	...	...	...	...	...
M. T. Bimlipatam ...	50,192	56	3	10·7	0·5	...	...	...	...	...	...	2	...	1	...	...	...
M. T. Vizianagram.	14,046	366	56	26·0	3·9	...	...	...	...	...	...	52	4	...	...	...	...
M. T. Palacondah.	8,335	129	4	15·4	0·4	...	...	...	...	...	...	...	...	...	...	...	4
Godavery District ...	1,427,472	31,939	...	22·3	...	...	...	...	...	...	...	...	...	...	...	...	...
M. T. Cocanada ...	16,167	294	...	18·1	...	...	...	...	...	...	...	...	...	...	...	...	...
M. T. Ellore ...	19,940	475	...	23·8	...	...	...	...	...	...	...	...	...	...	...	...	...
M. T. Rajahmundry.	17,498	349	...	19·9	...	...	...	...	...	...	...	...	...	...	...	...	...
Kistna District ...	1,246,852	22,656	3	18 1	0·002	...	...	3	...	...	...	...	...	...	...	...	...
M. T. Guntoor ...	15,184	201	...	13·2	...	...	...	...	...	...	...	...	...	...	...	...	...
M. T. Bunder ...	27 510	324	...	11·7	...	...	...	...	...	...	...	...	...	...	...	...	...
Nellore District ...	1,134,757	21,242	1,054	18·7	0·9	...	...	...	...	3	2	154	219	358	173	39	106
M. T. Masulipatam	22,857	268	64	11·7	2·8	...	..	...	...	...	...	3	28	33	...	...	...
Cuddapah District ...	1,144,759	21,370	1,859	18·6	1·6	12	5	18	8	7	96	715	533	363	68	8	6
M. T. Cuddapah ...	14,685	174	22	11·8	1·4	...	...	...	...	...	...	12	10	...	...	...	...
Bellary District ...	1,257,147	27,387	3,424	21·7	2·7	...	...	10	1	258	1,219	1,295	532	87	22	...	...
M. T. Bellary ...	37,015	425	21	11·4	0·5	...	...	...	...	1	1	17	2	...	...	...	...
M. T. Adoni ...	17,828	389	178	21·8	9·9	...	...	...	...	...	21	155	2	...	...	...	...
M. T. Ghooty ...	4,097	88	21	21·4	5·1	...	...	...	...	2	7	10	2	...	...	...	...
M. T. Anantapoor.	4,426	85	8	19·4	1·8	...	...	...	...	...	3	2	1	2	...	...	...
Kurnool District ...	770,318	18,781	2,817	24·3	3·6	52	50	203	240	103	709	1,945	305	41	64	5	...
M. T. Kurnool ...	23,816	764	323	32·0	13·5	1	41	96	43	...	121	21	...	...	...	..	...
M. T. Cumbum ...	7,983	169	...	21·1	...	...	...	...	...	...	...	...	...	...	...	...	...
Madras District ...	12,08,007	26,532	1,127	21·9	0·9	...	...	...	2	5	5	170	269	218	156	137	165
M. T. Madras ...	450,000	11,262	568	25·02	1·3	...	...	...	2	5	5	80	229	147	73	16	11
M. T. Conjeveram.	31,939	471	110	14·7	3·4	...	...	...	...	...	...	3	...	...	21	52	34
North Arcot District..	1,775,506	34,842	2,605	19·6	2·03	3	...	5	...	2	36	705	339	549	447	213	256
M. T. Vellore ...	30,529	483	7	15·8	0·1	...	...	...	...	...	...	5	1	1	...	...	...
M. T. Wallajah ...	10,993	167	21	15·1	1·9	...	...	...	...	...	5	13	3	...	...	...	...
South Arcot District..	1,092,958	16,839	544	15·4	0·4	4	2	1	3	5	4	14	3	27	31	63	393
M. T. Cuddalore ...	27,424	338	27	12·3	0·9	...	...	...	...	...	...	...	...	...	17	7	3
Tanjore District ...	1,717,268	41,425	4,563	24·1	2·5	19	18	16	13	13	26	13	138	281	542	1,258	2,226
M. T. Tanjore ...	36,941	1,068	157	28·9	4·2	...	...	1	...	...	2	...	75	25	18	1	35
M. T. Combaconum.	29,283	676	125	23·0	4·2	...	3	...	1	1	1	...	2	2	...	36	79
M. T. Mayaveram.	17,025	524	16	30·7	0·9	...	...	...	...	...	...	...	1	...	...	11	4
M. T. Negapatam.	33,095	761	62	22·9	1·8	2	1	1	...	...	...	..	...	...	19	2	37
M. T. Manargoody.	19,447	552	44	28·3	2·2	...	...	...	...	...	...	...	2	2	15	11	14
Trichinopoly District.	990,037	15,094	522	15·2	0·5	6	7	4	4	...	6	...	8	6	7	69	405
M. T. Trichinopoly.	53,623	985	89	18·3	1·6	...	...	...	...	...	...	...	...	...	...	...	89
Madura District ...	1,901,774	18,688	72	9 8	0·03	4	10	2	8	4	7	5	8	6	2	3	13
M. T. Madura ...	......	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
M. T. Dindigul ...	8,951	189	1	21·1	0·1	...	...	...	...	...	1	...	...	...	...	...	...
Tinnevelly District...	1,082,301	21,808	80	20·1	0·07	5	7	12	4	5	9	7	5	5	3	9	9
M. T. Tinnevelly...	21,553	389	2	18 0	0·09	...	1	...	...	...	...	...	...	...	...	1	..
M. T. Palamcottah.	13,315	259	...	19·4	...	...	...	...	...	...	...	...	...	...	...	...	...
M. T. Tuticorin ...	9,514	247	1	25·8	0·1	...	...	...	...	...	1	...	...	...	...	...	...
Coimbatore District...	1,393,582	16,525	204	11·1	0·1	2	...	...	1	1	1	4	3	8	64	60	60
M. T. Coimbatore.	25,324	354	2	13·9	0·07	...	...	...	...	...	...	...	...	...	2	...	...
Salem District ...	1,619,233	24,839	297	15·3	0·1	4	3	3	17	...	2	2	...	20	36	129	81
M. T. Salem ...	33,072	215	20	7·4	0·6	...	...	...	...	...	...	...	...	3	16	...	1
South Canara District	834,425	18,151	184	21·7	0·2	18	30	11	15	5	9	13	8	14	33	19	9
M. T. Mangalore...	23,668	524	10	22·1	0·4	...	...	1	...	1	1	...	...	...	3	4	...
Malabar District ...	1,819,671	34,331	131	18·5	0·07	...	3	19	19	18	5	1	13	32	9	9	3
M. T. Tellicherry.	17,726	459	...	25·8	...	...	...	...	...	...	...	...	...	...	...	...	...
M. T. Calicut ...	36,602	1,037	26	28·3	0·7	...	...	...	...	...	...	...	9	15	2	...	...
M. T. Palghaut ...	27,533	430	...	15 6	...	...	...	...	...	...	...	...	...	...	...	...	...
M. T. Cochin ...	9,940	264	...	26·5	...	...	...	...	...	...	...	...	...	...	...	...	...
Neligherry District ...	38,142	865	...	22 6	...	...	...	...	...	...	...	...	...	...	...	...	...

APPENDIX V.—*(Continued.)*

Table showing the Total Deaths and Mortality from Cholera in the several Jails of the Madras Presidency during 1869.

Jails.	Strength.	Total Deaths.	Cholera Deaths.	Ratio per 1,000 of strength. Total Deaths.	Ratio per 1,000 of strength. Cholera Deaths.	Months of prevalence of Cholera. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
European Prison, Ootacamund.	27	...	...	......	......	...	...	...	...	...	...	...	...	...	...	...	...
Central Jails.																	
Coimbatore	969	22	...	22·7	......	...	...	...	...	...	...	...	...	...	...	...	...
Rajahmundry	896	14	...	15·6	......	...	...	...	...	...	...	...	...	...	...	...	...
Trichinopoly...	656	35	...	53·3	......	...	...	...	...	...	...	...	...	...	...	...	...
Salem	506	4	...	7·9	......	...	...	...	...	...	...	...	...	...	...	...	...
Vellore	451	19	...	42·1	......	...	...	...	...	...	...	...	...	...	...	...	...
Cannanore	301	21	...	69·7	......	...	...	...	...	...	...	...	...	...	...	...	...
District Jails.																	
Madras Penitentiary ...	467	5	1	10·7	2·1	...	...	...	...	...	...	...	1	...	...	...	...
H. M.'s Jail, Madras ...	33	...	...	......	......	...	...	...	...	...	...	...	...	...	...	...	...
Lawrence Asylum Works ...	417	14	...	33·5	......	...	...	...	...	...	...	...	...	...	...	...	...
Madura	379	6	...	15·8	......	...	...	...	...	...	...	...	...	...	...	...	...
Cuddalore	338	39	1	115·3	2·9	...	1	...	...	...	...	...	...	...	...	...	...
Bellary	320	14	...	43·7	......	...	...	...	...	...	...	...	...	...	...	...	...
Chittoor	317	1	...	3 1	......	...	...	...	...	...	...	...	...	...	...	...	...
Vizagapatam	305	11	...	36·0	......	...	...	...	...	...	...	...	...	...	...	...	...
Palamcottah...	287	24	...	83·6	......	...	...	...	...	...	...	...	...	...	...	...	...
Trichinopoly...	219	7	1	31·9	4·5	...	...	...	...	...	...	...	...	...	...	...	1
Calicut	215	22	...	102·3	......	...	...	...	...	...	...	...	...	...	...	...	...
Ootacamund (Native Jail) ...	212	12	...	56·6	......	...	...	...	...	...	...	...	...	...	...	...	...
Cuddapah	203	15	2	73·8	9 8	...	...	...	...	...	...	...	2	...	...	...	...
Tanjore	196	8	1	40·8	5·1	...	...	...	...	...	...	...	1	...	...	...	...
Kurnool	188	12	11	63·8	61·1	...	4	7	...	...	...	...	...	...	...	...	...
Chingleput	186	6	...	32·2	......	...	...	...	...	...	...	...	...	...	...	...	...
Berhampore	185	30	13	162·1	70·2	...	...	...	...	...	...	10	3	...	...	...	...
Vellore	184	7	2	38·5	10·9	...	...	...	...	...	...	2	...	...	...	...	...
Nellore	176	12	11	68·1	62·5	...	...	...	...	...	...	...	11	...	...	...	...
Coimbatore	165	4	...	24·3	......	...	...	...	...	...	...	...	...	...	...	...	...
Mangalore	143	14	...	97·9	......	...	...	...	...	...	...	...	...	...	...	...	...
Tranquebar	143	12	...	83·9	......	...	...	...	...	...	...	...	...	...	...	...	...
Guntoor	140	...	...	......	......	...	...	...	...	...	...	...	...	...	...	...	...
Paumbum	105	2	...	19 0	......	...	...	...	...	...	...	...	...	...	...	...	...
Russelcondah	90	4	...	44·4	......	...	...	...	...	...	...	...	...	...	...	...	...
Rajahmundry	88	1	...	11·4	......	...	...	...	...	...	...	...	...	...	...	...	...
Tellicherry	82	10	...	121·9	......	...	...	...	...	...	...	...	...	...	...	...	...
Cannanore	79	3	...	37 9	......	...	...	...	...	...	...	...	...	...	...	...	...
Masulipatam...	74	...	...	......	......	...	...	...	...	...	...	...	...	...	...	...	...
Guindy	74	2	...	27·0	......	...	...	...	...	...	...	...	...	...	...	...	...
Cochin	17	...	...	......	......	...	...	...	...	...	...	...	...	...	...	...	...

APPENDIX V.—(*Continued.*)

Table showing the Total Deaths and Mortality from Cholera among European Troops at each Station of the Madras Presidency during the year 1869.

Stations.	Strength.	Total Deaths.	Cholera Deaths.	Ratio per 1,000 of Strength.		Months of prevalence of Cholera.											
				Total Deaths.	Cholera Deaths.	January.	February	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Fort Saint George	819	16	5	19·5	6·1	...	...	...	...	...	...	...	1	4	...	...	...
Saint Thomas' Mount ...	487	14	1	28·7	2·05	...	...	...	...	...	...	...	...	1	...	...	...
Vellore	7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Poonamallee	142	12	...	84·5	...	...	...	...	...	...	...	...	...	...	...	...	...
Palaveram......	253	13	5	51·3	19·7	...	...	...	...	...	...	...	...	*5	...	...	...
Vizagapatam...	90	4	...	44·4	...	...	...	...	...	...	...	...	...	...	...	...	...
Trichinopoly	345	8	...	23·1	...	...	...	...	...	...	...	...	...	...	...	...	...
Wellington	389	6	...	15·4	...	...	...	...	...	...	...	...	...	...	...	...	...
Bangalore	2,025	30	...	14·8	...	...	...	...	...	...	...	...	...	...	...	...	...
Cannanore......	665	16	...	24·06	...	...	...	...	...	...	...	...	...	...	...	...	...
Calicut	29	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Malliapooram...	81	1	...	12·3	...	...	...	...	...	...	...	...	...	...	...	...	...
Bellary	908	8	...	8 8	...	...	...	...	...	...	...	...	...	...	...	...	...
Ramandroog	49	1	...	20·4	...	...	...	...	...	...	...	...	...	...	...	...	...
Secunderabad	2,091	74	4	25·8	1·9	...	...	...	1	...	...	2	1	...	...	...	...
Kamptee	721	25	5	32·9	6·9	...	...	...	2	1	1	...	...	...	...	1	...
Seetabuldee	30	2	...	50	...	...	...	...	...	...	...	...	...	...	...	...	...
Chindwarrah	15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Rangoon	834	9	1	10·7	1·1	1	...	...	...	...	...	...	...	...	...	...	...
Thayetmyoo	461	13	4	33 8	8·6	...	...	...	...	2	...	...	2	...	...	...	...
Tonghoo	320	3	...	9·3	...	...	...	...	...	...	...	...	...	...	...	...	...
Port Blair..	109	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Nyoungyo	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

* These deaths, though occurring at Palaverum, are actually due to Fort Saint George.

APPENDIX V.—*(Continued.)*

Table showing the total deaths and mortality from cholera among the Native Troops at each station of the Madras Presidency during the year 1869.

Stations.	Strength.	Total deaths.	Cholera deaths.	Ratio per 1,000 of strength. Total deaths.	Ratio per 1,000 of strength. Cholera deaths.	Months of prevalence of Cholera. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Madras	2,154	25	1	11·6	0·46	...	...	...	...	...	...	...	...	1	...	...	...
Saint Thomas' Mount ...	208	6	...	28·8	...	...	...	...	...	...	...	...	...	...	...	...	...
Palaveram	115	14	...	121·7	...	...	...	...	...	...	...	...	...	...	...	...	...
Vellore	566	18	2	31·8	3·5	...	...	...	...	...	...	...	...	...	2	...	...
Arcot...	13	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Vizianagram...	674	4	...	5·9	...	...	...	...	...	...	...	...	...	...	...	...	...
Berhampore	399	9	2	22·5	5·0	...	...	...	...	...	...	2	...	...	...	...	...
Cuttack	761	6	2	7·9	2·6	...	...	...	...	...	...	...	2	...	...	...	...
Sumbulpore	285	8	...	28·0	...	...	...	...	...	...	...	...	...	...	...	...	...
Vizagapatam...	794	12	...	15·1	...	...	...	...	...	...	...	...	...	...	...	...	...
Bangalore	1,820	26	...	14·3	...	...	...	...	...	...	...	...	...	...	...	...	...
French Rocks	540	5	...	9·2	...	...	...	...	...	...	...	...	...	...	...	...	...
Cannanore	1,298	16	...	12·3	...	...	...	...	...	...	...	...	...	...	...	...	...
Mangalore	670	7	...	10·3	...	...	...	...	...	...	...	...	...	...	...	...	...
Mercara	406	11	...	27·09	...	...	...	...	...	...	...	...	...	...	...	...	...
Luckady	72	2	...	27·7	...	...	...	...	...	...	...	...	...	...	...	...	...
Bellary	1,787	21	2	11·7	1·1	...	...	...	...	...	...	1	1	...	...	...	...
Kurnool	677	11	6	16· 2	8·8	...	1	2	3	...	...	...	...	...	...	...	...
Mysore	52	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Trichinopoly	1,388	14	1	10·08	0·7	...	...	...	...	...	...	...	...	...	...	...	1
Quilon	479	6	...	12·5	...	...	...	...	...	...	...	...	...	...	...	...	...
Trichoor	169	2	...	11·8	...	...	...	...	...	...	...	...	...	...	...	...	...
Trevandrum	83	1	...	12·04	...	...	...	...	...	...	...	...	...	...	...	...	...
Palamcottah	599	8	...	13·4	...	...	...	...	...	...	...	...	...	...	...	...	...
Secunderabad	2,693	33	7	12·2	2·2	2	1	...	...	1	...	1	2	...	...	...	...
Kamptee	1,312	10	3	7·6	2·2	...	...	1	...	...	...	...	...	2	...	...	...
Seetabuldee	470	4	1	8·5	2·1	...	...	...	...	...	...	...	...	1	...	...	...
Hoosungabad	373	3	1	8·04	2 6	...	...	...	...	1	...	...	...	...	...	...	...
Raepore	657	16	5	21·4	7·6	...	...	...	...	1	1	3	...	...	...	...	...
Chandah	19	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Seroncha	148	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Rangoon	1,560	19	..	12·1	...	...	...	...	...	...	...	...	...	...	...	...	...
Thayetmyoo	589	4	...	6·7	...	...	...	...	...	...	...	...	...	...	...	...	...
Moulmein	486	16	...	32·8	...	...	...	...	...	...	...	...	...	...	...	...	...
Tonghoo	557	6	...	10·7	...	...	...	...	...	...	...	...	...	...	...	...	...
Shoagheen	112	2	...	17·8	...	...	...	...	...	...	...	...	...	...	...	...	...
Singapore	244	3	...	12·2	...	...	...	...	...	...	...	...	...	...	...	...	...
Malacca	133	1	...	7·5	...	...	...	...	...	...	...	...	...	...	...	...	...
Port Blair	194	3	...	15·4	...	...	...	...	...	...	...	...	...	...	...	...	...
Nicobars	42	2	...	47·6	...	...	...	...	...	...	...	...	...	...	...	...	...

APPENDIX VI.

Report on an Epidemic of Cholera at Thayetmyoo, British Burmah, in 1869, *especially with reference to its appearance in the Head Quarters and Right Wing of Her Majesty's 76th Regiment, by Surgeon* W. A. THOMSON, B.M.S.

Arrival of Wing, 76th Regiment, at Thayetmyoo.

1. THE Head Quarters and Right Wing of Her Majesty's 76th Regiment arrived at Thayetmyoo from Bellary on the 9th February 1868. From that date till April 1869, no choleraic disease, so far as I can ascertain, appears to have occurred, either among the European or Native inhabitants of the station.

First report of cholera in the neighbourhood.

2. On the morning of 25th April 1869, a case of cholera was reported in the "Cooly lines" situated to the north and just immediately outside Cantonment limits.

The occupants of the "Cooly lines" or "Cooly Village," are chiefly coolies employed in the Public Works Department, Regimental followers, such as Bheasties, toties and sweepers, and a few Burmans.

I immediately visited the spot to ascertain the truth of the rumour, and, after a careful inspection, forwarded a letter to the Brigade authorities, of which the following is a copy.

To the Brigade Major, Thayetmyoo.

SIR,

I have the honour to bring to the notice of the Officer Commanding the Station, the existence of cholera in the "Cooly lines," immediately in rear of the Artillery "Horse-keepers' lines," being only separated from the latter by a nullah (water course.)

The circumstance was first reported to me this morning, when I lost no time in visiting the spot accompanied by yourself.

I have just been there again with Dr. McAllum, the Civil Surgeon, and made a very searching examination with the following results, *viz.*,—

The disease appears to have broken out about twelve or fifteen days ago,* and to have gone on steadily up to this date, the total number of deaths so far as we can ascertain from the commencement of the disease up to this morning has been twelve. Of this number four deaths have taken place in the last twenty-four hours. A toty attached to the 76th Regiment was the last victim ; he died at 6. A. M. this day. There are at present two fresh cases, (Burmesewomen) both of which will probably succumb.

Filthy state of "Cooly Lines."

I have now the honor most urgently to bring to notice the filthy condition of the "Cooly lines."

Situated just beyond Cantonment limits though in reality under civil control, yet they seem to be looked after by no one, consequently their insanitary condition can be more readily imagined than described.

They contain, in fact all the best elements for fostering epidemic disease, and I have no hesitation in stating, that, if very strong sanitary measures are not immediately undertaken and rigorously carried out, the lives of the garrison will be imperilled.

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* This instance affords a good example of the enormous difficulty that exists in regard to tracing out the earlier cases of cholera in a locality. At Thayetmyoo there were some eight or ten Commissioned and Warrant Medical Officers on the spot, who were capable of recognizing the disease, but although the village lay close by the Military Cantonment, cholera had been prevailing for a fortnight, before the fact came to the notice of the Medical Officers. These difficulties are much enhanced in districts remote from Medical or Sanitary supervision.—W. R. C., *Sanitary Commissioner.*

A great portion of this village is occupied by Regimental followers who by residing there remove themselves from all control and supervision, in fact put themselves out of the way of that ready medical treatment to which they are entitled when sick.

I would strongly urge on the consideration of the civil authorities, the necessity of removing the village entirely and compelling the residents to remove to the Sudder Bazaar where sanitary rules could be properly enforced.

In conclusion as a precautionary measure, I have the honor to recommend that, all soldiers of the Royal Artillery and 76th Regiment, as well as Native Infantry should be prevented entering the "Cooly lines" by placing a cordon of Police sentries round them. This would be more effectual than merely issuing orders on the subject which are difficult to be enforced and apt to cause alarm.

I have, &c.,
(Signed) W. A. THOMSON, Surgeon,
76th Regiment, Senior Medical Officer,
British Medical Service,
and Sanitary Officer.

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3. This letter was forwarded to the Assistant Commissioner of Thayetmyoo, who at once took active steps to have the "Cooly lines" cleansed, placed Police sentries near to prevent soldiers from having access to the place ; and gave orders to the head-man of the village to report daily the state of health of the inhabitants to the Civil Surgeon, and immediately, the occurrence of a fresh case of cholera.

Action of civil authorities.

The Assistant Commissioner communicated with the Deputy Commissioner of the District on the subject and especially with a view to getting sanction for the entire removal of the "Cooly lines."

The Deputy Commissioner in reply called for the opinion of the Military and Medical authorities at Thayetmyoo as to the advisability of such a step.

Opinion of Cantonment Committee.

4. The matter was accordingly laid before the President and Members of the Cantonment Committee who were unanimously of opinion that the village should be removed, both on Military and Sanitary grounds.

This decision was accordingly conveyed to the Deputy Commissioner. What the ultimate issue may be, I am, as yet, unable to state.

No decisive steps can be taken in the matter without the sanction of the local Government.

Progress of cholera.

5. Up to the 26th April, so far as could be ascertained, some twelve cases had occurred in the "Cooly village" of which number, eight died.

Cholera leaves "Cooly lines."

From that date the disease seems to have left the village.

Appears in "Shye Bustie."

On the 5th May however, a Dhooly bearer employed in the Commissariat Godowns in the Fort and residing in the "Shye Bustie" a village on the bank of the Irrawaddy to the east of the "Cooly village" in a direct line and distant from it about 400 yards more or less, was suddenly seized with malignant cholera, rice water dejecta, cramps, collapse, &c., being well marked. He recovered from the primary symptoms and was apparently doing well when secondary fever set in, and carried him off on the 14th May, nine days after seizure.

Cholera in Lascar Lines.

On the 7th May a store Lascar living in the Store Lascars' lines, close to the Battery horsekeepers' lines was attacked and died on the 8th May. These two cases were treated in tents pitched on an open elevated and airy spot to the north of the Fort. The position was good, sufficiently isolated and to leeward of the station, they were treated by a Native Dresser under the supervision of the Civil Surgeon.

It is difficult to ascertain accurately the dates on which the first case occurred in the "Cooly village," but I think it must have been about the 10th or 11th April. The last case as I said before occurred on the 26th April.

6. Supposed total cases in Cooly village from 11th to 26th April, 12,—deaths 8

Re-capitulation. Actual total cases in Shye Bustie, from 5th to 14th May, 1,—death 1

Actual total cases in Lascars Lines, from 7th to 8th May, 1,—death 1

Since the 8th May only one case has occurred amongst the natives in Cantonments, which will be referred to hereafter.

Outbreak of Cholera in 76th Regiment.

7. On the afternoon of the 9th May Mrs. Sullivan, wife of Private Sullivan 76th Regiment was brought to Hospital at 2-30 P.M., in collapse, with rice water dejections and severe cramps. She died at 4-10 A.M., the following morning 10th May.

Description of Married Barracks.

8. Mrs. Sullivan resided in "No. 10" married barracks at the eastern end of the 76th lines. The building, like all the European Infantry Barracks at this station, is well built of wood and raised ten feet six inches from the ground. It has a wide verandah back and front. It contains fifteen quarters, each quarter consisting of two rooms. They are well ventilated.

Sanitary condition.

9. The Sanitary condition of the building and out-houses at the time of the out-break was good. The total number of persons living in the building at that period including men, women and children was thirty-five. There was no over-crowding.

Nature of Mrs. Sullivan's case.

Premonitary Diarrhœa.

Cramps set in.

10. Mrs. Sullivan's case was rapid and most malignant. Her husband states, that about 9 A.M. of the day she was attacked, she complained of looseness, and went several times to the privy, but did not think much about it or seek medical relief; about ½ past 1 P.M. she felt weak and lay down and slept about half an hour, when she suddenly awoke and called him to rub her legs which were painfully cramped. He did so and then asked her to get up and walk about, thinking it might do her good and not knowing what was the matter with her, she got up and tried to walk, but immediately fell over in a sort of fit (most likely fainted). He then got her conveyed to hospital. Such is the husband's story; strange that he should never have imagined when he saw his wife suffering so acutely from diarrhœa in the morning, that it would be advisable to get some medicine for her.

Collapse.

When seen by me at 3 P.M. she was in collapse, her features sunken and quite altered, in fact she had all the characters of well marked malignant cholera, devoloped to a degree that I have seldom seen equalled.

Death of Mrs. Sullivan.

As stated above she died at 4—10 A.M. of the 10th May comatose, thirteen hours after admission.

Precautionary measures.

11. On the afternoon of the 9th May, I had Private Sullivan's quarters evacuated, cleansed, and fumigated, and all soiled linen, bedding, &c., disinfected, and where necessary, burned. Cholera medicines (astringent pills and stimulant mixture) were the same night distributed to each barrack and placed in charge of a responsible Non-Commissioned Officer with plain directions. On the following morning, 10th May, the number of patients in Hospital was reduced to a minimum by discharging every case which could possibly be treated outside. Arrangements were made for the reception of fresh cases of cholera in the old Hospital buildings, at the time unoccupied.

Progress of the Disease.

12. At 4 P.M. on the 10th May, Private Hinton came to Hospital from the same building as Mrs. Sullivan (No. 10, family barrack), with well-marked symptoms of cholera, though not of so malignant a character as hers. His room was four doors above Sullivan's. He progressed favourably and was discharged convalescent on 18th May.

Evacuation of No. 10 Family Barrack.

13. On the morning of the 11th May all the families residing in No. 10, family barracks, were removed and placed under canvass on an open space of ground inside the redoubt, situated on the bank of the river at the north-east

Encampment in the Fort.

end of the station and about 350 yards from the nearest barrack, to leeward. Each family had a separate tent and sanitary arrangements, for the whole party were duly attended to.

The disease spreads.

14. At 7 A.M. on the 11th May (the same day as the families moved out) the child of Private Dellury who had resided in No. 10 barrack, in the next room to Private Hinton, was admitted from the camp with cholera and died the following morning at 8 A. M.

It appears in No. 11, Family Barrack.

At 2 P.M. the same day Mrs. Jones, wife of Private Jones, residing in No. 11, family barrack, a block of buildings in a direct line with No. 10, but separated from it by a space of 60 yards, was admitted with cholera; she recovered.

Fresh cases in Camp in the Fort.

At 3 P.M., child M. Bawn was admitted from the camp and died the same night at 10-30 P. M. in collapse.

At 4 P.M., Mrs. Griffin, wife of Private Griffin, was brought in from camp, with well-marked symptoms; she died the following evening at 7 P. M.

Progress of the Disease.

At the same time as the last case (Mrs. Griffin) was admitted, Mrs. Dippold, wife of Serjeant Dippold was brought in from the camp with cholera. She recovered after a tedious convalescence.

Case of Child McAlister.

15. At 10 P.M. on the night of the 11th May, child McAlister was admitted from a detached bungalow on a healthy site close to the Native Infantry lines and a long way from the infected barrack. She had gone to bed in apparent health and woke up about 9-30 P.M., with a cry of pain. Her parents tried some domestic remedies, but finding her getting worse brought her to Hospital. When admitted she was in collapse and almost moribund. She died at 8 A.M. next, morning, the 12th instant.

The circumstances connected with child McAlister's seizure are highly interesting. I have stated she resided in a detached bungalow some distance from the infected barrack. Her parents, up to a fortnight previous to the outbreak in No. 10, married barrack, had resided in that very building, when her father being appointed acting Barrack Serjeant, removed to the bungalow aforenamed. The child however, was in the habit of attending school daily, and occasionally paid a visit to her old quarters.

On the morning of the 10th May, the day after the outbreak, she breakfasted in No. 10 barrack with the children Bawn, (two of whom eventually died), and the following morning she returned to the building and was present when its occupants were moving out to go into the Fort under canvass. That same night, as I have said before, she was seized with the disease and died in a few hours. This certainly looks very like contagion, at any rate it proves that the poison must have existed in that barrack in a highly concentrated form, and it must be presumed that there was something in the child's bodily state of health at the time, which rendered it a fit and ready recipient of the poison. It is not likely that imagination or fear had anything to do with pre-disposing her. This is undoubtedly a pre-disposing cause with adults, but in a young child who probably did not know even the name of the disease, much less the terrors accompanying its progress, imagination would have very little part in the matter.

It is natural to suppose that the delicate organization of children as compared with adults would render them more liable to be attacked, and it is undeniable that when the former do get cholera, their chances of recovery are very small, yet so capricious is this extraordinary pest in selecting its victims, that the strong healthy man is often knocked over and the tender delicate infant left unharmed. No other case occurred in McAlister's family.

Progress of the disease.

On the morning of the 12th May, about 9 A.M., another child Bawn was admitted from the Camp in the Fort in a state of collapse; it died at 2 P. M. the same day.

At 6 P. M. of the 12th, Private Griffin, (whose wife died the same evening) was admitted from Camp in the Fort with well-marked symptoms; he recovered.

At 5-30 P. M. on the 13th, Private Dellury (whose child died on the previous day and on which he had been in constant attendance) was admitted also from Camp in the Fort. He died at 5-30 A. M. next morning the 14th.

A case of Choleraic Diarrhœa in No. 11 married Barrack.

On the morning of the 13th May, Mrs. Comerford, wife of the School-master, who resided in No. 11 barrack, the same building whence Mrs. Jones was admitted on the 11th instant, was attacked with choleraic diarrhœa. The symptoms seemed to yield readily to treatment and she was apparently convalescing, when, on the 17th secondary fever set in and she died comatose on the evening of the 18th.

On the morning of the 14th May, Private Jones, who had been in constant attendance on his wife since the 11th instant was attacked and died the following morning.

Removal of families from Fort to Camp on Brigade parade ground.

16. On the previous day (13th), I recommended to the Brigadier-General the removal of the families, from the Fort to a Camp on a more elevated and more easily isolated spot, on the Brigade parade ground to the west, and at the same time to leeward of the barracks and distant from the nearest (Artillery Barrack) about 560 yards.

The following copy of a letter will explain my views on the subject of this move :—

Letter to Brigade-Major, recommending removal of families to Brigade parade ground.

With reference to the contemplated removal of the families of 76th Regiment from the Camp in the Fort to a new site on the Brigade parade ground, I have the honour to point out to the Brigadier-General Commanding, that to properly fulfil the object of this move and carry out with some hope of success the separation of the infected from the healthy, it will be necessary in this new camp, as far as possible to insist on isolation. If free promiscuous communication is allowed between the barracks and the camp, the benefit of the removal will probably be nullified.

I would therefore beg most strongly to recommend, that the camp should be treated just as if it was ten miles out of the station and have its separate establishment of cooks, sweepers, toties, bheesties, &c., the whole under the command of an Officer. It will consequently be necessary that two Hospital tents should be pitched, one for women and one for men, and two native tents, one for a Hospital privy and one for a native dresser.

It is of the very first importance that all sickness be treated in the camp, and no cases should on any account be sent in from there to the Regimental Hospitals.

Our Hospital establishment is certainly very small, but in an emergency like the present we must do the best we can, and I am sure Dr. McAllum * will render every assistance in his power if necessary, to call for it.

* Surgeon, 36th M. N. I., and Civil Surgeon.

I am also well aware, that from insufficiency of tents and means of conveyance, &c., our hands are much tied, but I feel so convinced from former experience, of the necessity for taking these steps now, so that in the event of the epidemic increasing, we may be ready to deal with it, that I feel no hesitation in laying these suggestions before Brigadier-General Nott for his serious consideration, being convinced that as far as our limited means go, he will give his approval to the foregoing proposals.

I have, &c.,

(Signed) W. A. THOMSON,

Surgeon, 76th Regiment, Senior Medical Officer, British Medical Service.

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17. The removal was effected on the 14th. A Native Dresser was placed in Medical charge and the camp visited twice daily by a Medical Officer. Isolation, so far as possible, was carried out. The families remained under canvass fourteen days and enjoyed very good health.

In the mean time the evacuated barracks were thoroughly cleansed and fumigated, in accordance with existing orders. Since the re-occupation, they have been perfectly healthy.

Solitary case occurs in No. 12, married Barrack.

18. From the 14th to 29th May all traces of choleraic disease had disappeared, when on the morning of the latter date, Private Arthur (residing in No. 12 'married' barrack, situated in a direct line with Nos. 10 and 11 to the westward, and distant from the latter 115 yards) was brought to Hospital with well-marked symptoms of malignant cholera. He came to Hospital the previous evening complaining of diarrhœa, got medicine and returned to his quarters. He felt relieved and easy till 2 A. M., when purging returned, and about 4 A. M. he was brought to Hospital. He was very ill for sometime, but finally recovered.

There is no accounting for this case; all trace of the disease had, apparently disappeared for a fortnight. Such solitary instances however are not uncommon at the close of an epidemic.

Private Arthur is a steady married man of temperate habits and usually in the enjoyment of good health.

The Sanitary condition of No. 12, family barrack, was excellent.

In a previous portion of this report I stated that only one case of cholera had occurred amongst the Natives in Cantonments since the 8th May and to which reference would be made hereafter.

Mrs. Comerford's Ayah resident in Lascars' lines seized with Cholera on 16th May.

19. The case in question occurred on the 16th May in the person of a native female, a resident of the Ordnance Lascars' lines, who was employed during the day-time in the capacity of Ayah (nurse) by Mrs. Comerford, but who used to return to her home every night to sleep. She states that on the 16th May she was quite well up to 7 P. M., when she suddenly had a loose motion. At the time she was attending on Mrs. Comerford, who, as previously noted, was attacked with choleraic diarrhœa on 13th May and died on 18th May. The Ayah did not seem to attach any importance to the sudden attack of diarrhœa which came on at 7 P. M., for she says she returned to her home in the Ordnance Lascars' lines and ate her supper; at 8 P. M. diarrhœa again came on and lasted at frequent intervals throughout the night; vomiting came on early in the morning; after that she got worse and had cramps and coldness of surface. At 8 A. M. she was removed to the R. A. Hospital and the case pronounced to be genuine cholera; she ultimately recovered. With the exception of some native decoction, she got no medicine whatever until her arrival at the R. A. Hospital, for the simple reason that no assistance was sought for until then, although both she and her friends knew it could be got in a few minutes, if they chose to ask for it.

The case is interesting, inasmuch as it was the only instance of a native employed in attendance on cholera patients during this epidemic in 76th Regiment being attacked with the disease.

20. Such is an outline of this first outbreak of cholera from its commencement on 9th May to its termination on 29th May. The annexed table will show the cases in their order. It is very remarkable that none but married people and children should have been attacked and that the disease should have clung exclusively to the range of family barracks. It expended its violence on No. 10, was less severe in No. 11, and least of all in No. 12.

Return showing the number of Men, Women and Children, H. M.'s 76th Regiment, (Head-Quarters and Right Wing), stationed at Thayetmyoo, Burmah, attacked with Cholera and Choleraic Diarrhœa, from 9th to 29th May 1869.

No. of cases.	Date.	Names.	Diseases. Cholera.	Diseases. Choleraic Diarrhœa.	Age.	Company.	Previous health.	Habits.	Period in India.	Married or Single.	Hour of Admission.	How long previously suffering from symptoms of disease.	Where residing prior to outbreak of Cholera.	Whence Admitted. Barrack No.	Whence Admitted. Camp.	Symptoms on admission. Vomiting of characteristic discharges.	Symptoms on admission. Rice-water Stools.	Symptoms on admission. Cramp.	Symptoms on admission. Collapse.	Symptoms on admission. Suppression of Urine.	Result. Died. In stage of Collapse.	Result. Died. In stage of Re-action.	Result. Died. How long after admission.	Recovered and Date.	Remarks.
	1869.				Y. M.				Y. M.			Hours.	Barrack.										Hours		Strength on 9th May 1869. Officers 10. Men 365. Women 43. Children 55.
1	May 9th	Mrs. S. Sullivan	yes	..	26 0	10	Good	Temprt.	0 4	M.	1 P.M.	1½	10	10	...	yes	yes	yes	yes	yes	yes	...	15	......	
2	,, 10th	Private J. Hinton	yes	...	31 0	0	do.	do.	11 4	M.	5 P.M.	1½	10	10	...	yes	yes	yes	Slight	no	...	...	...	18th May	Since invalided for "Hepatitis."
3	,, 11th	Mrs. M. Jones	yes	...	27 0	8	do.	do.	4 4	M.	2 P.M.	2	11	11	...	yes	yes	yes	yes	no	...	...	...	22nd ,,	
4	,, 11th	Child Margt. Bawn ...	yes	...	2-11	1	do.	do.	2 11	...	3 P.M.	1	10	...	Camp.	yes	yes	yes	yes	yes	yes	...	7½	......	
5	,, 11th	Mrs. G. Dippold	yes	...	33 0	3	do.	do.	4 4	M.	4 P.M.	1	10	...	Camp	yes	yes	yes	yes	yes	...	...	...	25th May	
6	,, 11th	Mrs. M. Griffin	yes	...	27 0	1	do.	do.	4 4	M.	4 P.M.	1	10	...	Camp.	yes	yes	yes	yes	yes	yes	...	24	......	
7	,, 11th	Child Minnie McAlister ...	yes	...	4-11	1	do.	do.	4 4	...	11 P.M.	1	Detached house out of Barrack.	Detached house out of Barrack	...	yes	yes	yes	yes	yes	yes	...	9	......	
8	,, 11th	,, Ellen Bawn, ...	yes	...	4 0	1	do.	do.	4 0	...	11 P.M.	½	10	...	Camp.	yes	yes	yes	yes	yes	yes	...	9	......	
9	,, 12th	,, Bridgt. Dellury ...	yes	...	4 0	10	do.	do.	4 0	...	7 A.M.	½	10	...	Camp.	yes	yes	yes	yes	yes	yes	...	13	......	
10	,, 12th	Private C. Griffin	yes	...	32 0	1	do.	do.	4 4	M.	8 P.M.	2	10	...	Camp.	yes	yes	yes	yes	no	...	...	...	24th May	
11	,, 13th	Mrs. C. Comerford ...	...	yes	32 0	3	do.	do.	5 4	M.	4-50 A.M.	1	11	11	...	Choleraic.	Choleraic.	Slight	no	no	..	...	112	......	Died on 18th May of secondary fever.
12	,, 13th	Private G. Dellury ...	yes	...	28 0	10	do.	do.	8 6	M.	5-30 A.M.	1	10	...	Camp.	yes	yes	yes	yes	yes	yes	...	12	......	
13	,, 14th	Private T. Jones	yes	...	29 0	8	do.	Intempt	5 4	M.	6-30 A.M.	½	11	11	...	yes	yes	yes	yes	yes	yes	...	22	......	
14	,, 29th	Private J. Arthur ...	yes	...	28 0	10	do.	Temprt.	10 3	M.	6-30 A.M.	½	12	12	...	yes	yes	yes	yes	Partial	...	...	...	9th June	

21. What peculiarity there should be in connection with either of those buildings which induced cholera poison to settle and germinate among the inmates, I have no means of ascertaining. That cholera germs were present in an active form in the atmosphere of the station from the time the disease commenced in the Cooly village, there can be, I imagine, little doubt. But why should these germs not have fructified more extensively amongst the people residing in the immediate neighbourhood of that village ?

The Artillery horse-keepers' lines, only separated from the village by a nullah (dry at that season) and having constant daily communication with it, although under good supervision, yet undoubtedly contained most of the supposed elements for fostering cholera. The horse-keepers have been to this hour intact.

The disease not only passed over the "lines" indicated, but also a portion of the Royal Artillery Barracks occupied by Staff Serjeants and their families, the Artillery guard-room, three blocks of single men's barracks (76th Regiment) and the 76th guard-room and cells, before appearing among the occupants of No. 10 family barrack. It travelled almost due south and against the prevailing wind, which, at that season especially, and in fact generally throughout the year, with the exception of a few weeks in the cold weather, blows from S. and S. W.

It will be seen on reference to the Appendix, that a certain proportion of the native followers attached both to the Battery, R. A., and to the 76th Regiment lived in the "Cooly village," and I have stated at the commencement of this report, that one of the latter, a toty, (or scavanger) died of cholera on 25th April. These followers were daily employed about the barracks in their several avocations, and it may not unreasonably be concluded that they carried the disease with them. As, however, they were employed indiscriminately throughout all the buildings, married and single, it does not explain the infection of the former and the exemption of the latter. Again, at the time of the outbreak, the ground floor of each of the family blocks, Nos. 10, 11, and 12 was being bricked, and a number of native coolies were employed daily on each. It struck me that perhaps those natives might have come from "Cooly village," and had something to do with introducing the disease into No. 10 Barrack, especially. After a most careful inquiry I found, that only one (a mason) lived in the "Cooly village," and that neither he nor any of the others, who all came from the town, had suffered from the disease, nor apparently had any of their relatives.

At no great distance from No. 10 Barrack and between it and the Hospital, a swimming bath was in process of erection at the period under consideration. I have ascertained that two masons employed at this bath resided in the "Cooly village." The first stated he was unmarried, and that there had been no cholera in or close to his house. The other stated he was married, and had lost a girl of six years old from cholera, while it was raging in the month of April in "Cooly village." Both men stated that they had no communication with No. 10, family Barrack.

To sum up the matter, there can be, I think, little doubt, that cholera came to the 76th married people from the "Cooly village." How it was introduced, and why it should have attacked them in preference to others in their close vicinity, I cannot say.

State of the Atmosphere during this Epidemic.

Total absence of proper Meteorological Instruments.

22. It would be interesting to note the atmospheric changes existing at the time of this first outbreak, but unfortunately there are no meteorological instruments in the station. The 76th Hospital possesses an ordinary bath Thermometer which is hung up in a Ward, it also has a rain-gauge. No other instruments are provided.

Great heat.

The temperature, especially from the 9th to 12th May inclusive was very high and every one complained of great oppressiveness. Two fatal cases of heat apoplexy occurred in the station at this period, one on the 10th the other on the 12th May. The Thermometer in the Hospital ranged on those days from 101 to 98. On the 13th May it went down to 90, which was the daily maximum observed in the Hospital from that date till the 16th inclusive.

On the 11th, 15 cents. of rain fell, on the 14th, 60 cents. and on the 16th, 1 inch 85 cents.

Rain-fall.

This last fall had the effect of cooling the air somewhat. There were no thunder-storms or dust-storms of any consequence, at any time during this epidemic.

No storms of Importance.

Prevailing Winds.

The prevailing winds were South and South-West with occasional gusts from the North and East.

23. It will be remembered that the last case of cholera recorded in the preceding pages as occurring in the Wing 76th Regiment was that of Private Arthur on the 29th May. Two months elapsed without a trace of the disease being observed either among the European or Native community, when on the 30th July Private Trotter, 76th Regiment, a patient in Hospital, suffering from secondary syphilis since 21st July, was suddenly and without any apparent reason attacked with cholera about 11-30 A. M. He had been seen by me that morning at the usual hour of visit, and I made a remark in the case book that he had been a little better the last day or two.

Second outbreak of Cholera in 76th Regiment, 30th July 1869.

At 4 P. M., I made the following entry—"about ½ past 11 A. M., he, (Private Trotter), "was observed to be sick at the stomach, to have an anxious expression and to be going "frequently to stool. His stools soon assumed a choleraic character, by ½ past 12 (noon) "unmistakeable symptoms of malignant cholera had set in ; stools rice-water, vomiting the "same. He had soon all the appearance of the worst form of cholera.

"At 3-30 his symptoms were :—tongue cold, breath cold, eyes dull, constant vomiting "and purging, constant and severe cramps all over the body, skin cold and clammy, pulse a "thread. At present (4-15 P. M., there is slight re-action, pulse better, vomiting continues.

"At 10 P. M. same report, pulse fluctuates remarkably, no urine passed since forenoon, "passed catheter, bladder empty."

Trotter was isolated as far as possible from the other patients and tents pitched as before for the reception of fresh cases. On the 3rd day (2nd August) he seemed better and gave slight hopes of recovery ; re-action was going on gradually and the various secretions becoming more active and natural. On the 5th day however, (4th August) symptoms of secondary fever set in which rapidly increased and on the morning of the 6th day (5th August) he died Comatose.

24. On the morning of the 1st August a second case occurred in the person of Private Springett, 76th Regiment. He was an acting Bandsman and resided in the Band Bungalow to the north of and at some little distance from the barrack used as a Hospital. On the morning of the 30th July he came to Hospital at 7 A.M., complaining of a gum boil; he was ordered local remedies and a purgative and detained for the day. He occupied a bed in the ward in which Trotter was seized with cholera at noon on the 30th July.

A second case occurs, 1st August.

His bed was quite at the far end of the ward from Trotter's. That portion of the Hospital was, soon after Trotter's seizure entirely evacuated, no one being left in it but Trotter.

On the morning of the 31st July, Springett again presented himself, complaining of pain in the hepatic region. He was ordered a sinapism and to be detained under observation. In the afternoon he complained of simple diarrhœa; his stools were carefully watched and appropriate treatment given, but it was not till the next morning, 1st August at 6 A. M. that choleraic symptoms showed themselves. He was then removed to a tent. He eventually recovered from cholera, but has since been invalided for chronic hepatitis. Whether he had the seeds of the disease in his system before he came to Hospital or contracted it in Hospital while under observation for hepatic derangement it is impossible to determine, but the latter is most likely the case, as there was no cholera reported in the town till 7th August and I have no proof that Springett had intercourse with any stranger coming from any place in the interior where the disease might at that time have been in existence. No other member of the Band was afterwards affected with cholera.

Why the disease should re-appear so suddenly in the barrack used as a Hospital after a lapse of two months since the last case in No. 12, married bungalow, I am unable to explain. The Sanitary condition of the Hospital and its surroundings was, so far as I could detect perfect.

25. On the evening of 4th August, Private Hunter, 76th Regiment, a patient in Hospital with fever since 18th July was attacked.

A third case occurs, a patient in Hospital, 4th August.

At the morning visit he complained of diarrhœa and was put under close observation and ordered appropriate treatment. At 6 P.M. rice-water stools began to show, soon followed by other characteristic signs of cholera. He was immediately removed to a tent. He recovered, but his convalescence was somewhat tedious.

Evacuation of the Hospital building.

In consequence of this last instance, I deemed it advisable to recommend the entire evacuation of the Hospital building and removal of the sick to a barrack close at hand, occupied by No. 3 Company, 76th Regiment, the Company being meanwhile accommodated elsewhere.

This removal was accomplished on the morning of 5th August, No. 3 Company having been previously distributed into two other barracks and thus all over-crowding of the men avoided. The abandoned Hospital was thoroughly cleansed, fumigated, and ventilated, and all the out-buildings connected with it, special attention being directed to the latrine.

State of the Atmosphere.

26. The atmosphere at this time was particularly muggy, close and depressing; loaded with moisture, but very little rain falling; an unusual state of things at this season, which is generally marked by a heavy rain-fall. Every one complained of the oppressiveness of the air, which seemed to affect most people with an undefinable idea of unhealthiness.

A fourth case occurs, in Barracks 5th August.

27. On the evening of 5th August, at 8 P. M., Private Allum, 76th Regiment, was admitted from No. 8 Company barrack into the Hospital tent with cholera. His case was marked soon after admission by severe cramps along with vomiting and purging of characteristic discharges and a strong tendency to collapse. It was ascertained after his admission, from his own statement, that he had been suffering from severe diarrhœa all day, but although he knew that his Color Serjeant was provided with medicines and that strict orders were issued to all men to report themselves and seek relief the moment they felt uneasy in their bowels, yet he did not do so "because he thought it would wear off." He eventually recovered. How many lives, however, have been lost by this foolish and obstinate procrastination.

A fifth case occurs, a patient in Hospital, 7th August.

28. At 9-15 A.M. of the 7th August, Private Coombs, 76th Regiment, a patient in Hospital suffering from dyspepsia accompained with debility and a tendency to irregular paroxysms of ague, was seized with cholera. His case from the first seemed hopeless, his previous weak state being greatly against him. He died at 9 o'clock the same night in collapse. It was particularly observed that strong muscular contractions of the hands with partial up-liftings of each fore-arm, contractions of the toes, and great heat of inside of thighs, continued for fully one hour after life appeared to be quite extinct.

Appearance of Cholera in the Native Town of Thayetmyoo, 7th August.

29. On the morning of 7th August the Assistant Commissioner of Thayetmyoo reported a supposed death from cholera on the previous night in the town. The subject was said to have arrived from Prome the same evening, and to have been ill for two or three days before his arrival.

Cholera in Native Town.

On the following day, 8th August, the Civil Surgeon reported three cases of cholera in the town and one death.

On 9th August two fresh cases and one death.

On 10th August nine fresh cases and eight deaths.

The disease continued in the Native town till 5th September.

The total cases reported from 8th August to 5th September were 47, viz. :—

Table of Cholera in Native Town of Thayetmyoo.

	Men.	Women.	Children.	Total.
Admitted from 8th August to 5th September ...	12	14	21	47
Discharged do. ...	4	5	4	13
Died do. ...	8	9	17	34

The disease appears to have been most prevalent amongst children, and as usual the mortality very high. It is believed that many more cases occurred than those reported, so that the statistics given cannot be relied on as affording a correct estimate of the numbers attacked or the rate of mortality. During the prevalence of cholera in the native town the Troops were cautioned not to visit it, except when obliged to do so to purchase the necessaries of life.

The disease, as it existed in the neighbouring country will be referred to hereafter.

Tendency to Diarrhœa in 76th Regiment, from 7th to 30th August.

30. From the 7th to the 30th August there was observed a tendency to diarrhœa amongst the men of the 76th Regiment, but not among the Royal Artillery or native Troops. On 22nd August, a patient in 76th Hospital, suffering from fever was suddenly attacked with diarrhœa which at first showed a strong tendency to become choleraic ; happily, however, the prompt treatment adopted, proved successful and in course of a couple of hours, all unpleasant symptoms had disappeared. So suspicious a case occurring fifteen days since the last instance of cholera sufficed to show that the disease still lurked among us.

A suspicious case in Hospital, 76th Regiment, 22nd August.

Third outbreak of Cholera in 76th Regiment, 30th August, a patient in Hospital.

31. Nothing further of note occurred till 30th August, when Private Prior, 76th Regiment a patient in hospital suffering from fever was suddenly attacked with cholera. He was immediately removed to a tent for treatment. His case was at first considered hopeless, his weak state when seized being greatly against him, but eventually be recovered after a tedious convalescence, and has since been invalided.

No. 2 Barrack evacuated by the sick, who are re-transferred to the Hospital.

It had been arranged that on this day the patients should be removed back into the Hospital which was evacuated on the 5th August, and which had in the meantime been carefully cleansed, fumigated and ventilated. The occurrence of this fresh case of cholera was an additional incentive for doing so, as it was the second which had within the month originated in the barrack temporarily occupied as a hospital. The removal of the patients was accordingly effected, and the evacuated barrack, thoroughly cleansed and fumigated and left open, and un-occupied until the 20th September, a period of three weeks being allowed to elapse before the Company returned to it.

Precautionary measures continued in full force.

32. All the sanitary, precautionary, and preventive measures which from the first had been recommended were, if possible, more strictly enforced than ever. In addition to the tents for treatment of cholera cases, an additional observation tent was pitched for the reception of men with symptoms of diarrhœa or Cholera Malaise, so that if possible, no case likely to turn into cholera should be admitted into the Hospital at all.

The disease appears in the Staff Serjeant's Quarters, 76th Regiment, 2nd September

33. On the afternoon of 2nd September a fresh case occurred in the Staff Serjeant's Quarters, 76th Regiment, a new building, well constructed, in a good and elevated situation, raised 10 feet, 6 inches from the ground, and apparently in excellent sanitary condition. It is placed at the eastern end of the Regimental lines in the direction of the river, and is 130 yards distant from No. 10, married barrack, where cholera first appeared in May.

Position of building.

Case of Child Taylor.

The subject of this fresh attack was a fine healthy boy aged 3 years and 8 months, step-son of the Orderly-room Clerk, 76th Regiment.

Fatal Result.

He was suddenly attacked at 4 P. M., having been previously in good health, and died at 5 A. M., the following morning, 3rd September.

Convulsions and hemiplegia precede death.

Violent convulsions, followed by complete left hemiplegia occurred three hours before death. The quarters in which the child was attacked were vacated as soon as the disease was detected and the occupants removed to an empty school-room in the vicinity. The child was treated in a tent.

O. R. Clerk, 76th Regiment, attacked with premonitory Diarrhœa, 6th September.

34. On the forenoon of the 6th September the Orderly Room Clerk himself, Serjeant Walsh, 76th Regiment, came to Hospital, complaining of looseness and malaise. He was detained in the observation tent and actively treated. His stools at this time were of a pea-soupy character and contained masses of undigested meat and fat. Previous to the attack he was in good health. His countenance and manner expressed anxiety, and although stimulants and sedatives were given and means taken to divert his mind, and if possible, induce a cheerful train of thought, yet he passed a restless night and had no sleep. At 6 A. M. next morning, the 7th September, rice-water stools, vomiting, and cramps set in, and his case was pronounced one of cholera. He recovered, but not without a struggle.

O. R. Clerk attacked with Cholera, 7th September.

Secondary fever set in with cerebral complication on the 8th September and from that date till the 12th he could neither collect nor concentrate his ideas properly; he mis-placed his words in a most peculiar manner, calling common things by wrong names. At the same time partial paralysis of the left lower extremity from the hip to the foot, was observed. His convalescence was tedious. He suffered for sometime from weakness of the left leg; complaining of numbness and dragging after walking a short distance and being easily fatigued. He was also liable to severe headache if he attempted to read or write for a short time.

On 9th November he was sent to Rangoon en route to Wellington on the Neilgherries, to which place he was recommended for change by a Medical Board. His health was considerably improved at the time of his departure.

Another case occurs in the Staff Serjeant's Quarters, 8th September.

35. Early on the morning of the 8th September the infant daughter of Drum Major Butcher, 76th Regiment, aged 1 year and 8 months, residing with its parents in the Staff Serjeant's Quarters in rooms adjoining those vacated by the Orderly Room Clerk on the 2nd instant, was attacked with cholera. The case ran its course rapidly to a fatal termination. Sudden convulsions followed by complete left hemiplegia came on at 9 P.M., and she died at 9-30 P. M., 16 hours after admission.

Fatal issue.

Convulsions and hemiplegia precede death.

Evacuation of Staff Serjeants' Quarters.

36. The necessity for evacuating the whole of the building occupied by the Staff Serjeants was now imperative.

Preliminary Camp.

In view of this necessity arising, as well as to be prepared for the removal of men from barracks should the disease spread, a preliminary camp capable of accommodating a Company and a certain proportion of married people, had been pitched on the Brigade parade ground a few days before. On the 8th September therefore the occupants of the Staff Serjeants' Quarters were removed to the camp in question. A special Hospital establishment was provided for the camp and a Medical subordinate placed in charge. A Medical Officer visited the camp morning and evening. All unnecessary communication between the camp and cantonment was prevented.

37. The families remained under canvass for fourteen days and enjoyed excellent health. Meanwhile their quarters were thoroughly cleansed, fumigated and ventilated. The building was re-occupied on 21st September; there has been no sickness in it since. Such is an outline of the third out-break of cholera this year in the 76th Regiment.

The following tables will show the cases as they occurred in the second and third outbreaks, and also a summary of all the cases from first to last:—

Return showing the number of Men Women and Children H. M.'s 76th Regiment (Head Quarters and Right Wing) stationed at Thayetmyoo, Burmah, treated for Cholera and Choleraic Diarrhœa, from 30th July to 8th September 1869.

Nomber of cases.	Date.	Names.	Diseases. Cholera.	Diseases. Choleraic Diarrhœa.	Age.	Company.	Previous health.	Habits.	Period in India.	Married or Single.	Hour of Admission.	How long previously suffering from symptoms of disease.	Where residing prior to outbreak of disease.	Whence Admitted. Barrack No.	Whence Admitted. Hospital and cause of Original Admission.	Symptoms on admission. Vomiting of characteristic discharges.	Symptoms on admission. Rice water Stools.	Symptoms on admission. Cramps.	Symptoms on admission. Collapse.	Symptoms on admission. Suppression of Urine.	Result Died. In stage of Collapse.	Result Died. In stage of Re-action	Result Died. How long after admission.	Recovered and Date.	Remarks. Strength on 30th July 1869. Officers 15. Men 340. Women 41. Children 47.
	1869.				Y. M.				Y. M.			Hours.											Days		
1	30th July	Private J. Trotter	yes	...	29	1	Delicate	Tempt.	5 3	S.	12 A.M.	½	Barrack Band	... Band	Hospital, Secondary Syphilis	yes	yes	yes	yes	yes	...	yes	6½	...	
2	1st Aug.	„ T. Springett ...	yes	...	19	10	Good.	do.	8	S.	6 A.M.	½	Barrack	Barrack	...	yes	yes	yes	yes	no	...	...	...	14th Aug.	Since Invalided "Hepatitis."
3	4th „	„ G. Hunter	yes	...	30	8	Delicate	do.	8 9	S.	6 P.M.	¼	Barrack	...	Hospital, Ague irreg	yes	yes	yes	yes	partial	...	...	...	18th „	
4	5th „	„ W. Allum	yes	...	24	8	Good.	do.	5 7	S.	10 P.M.	1	Barrack	Barrack	...	yes	yes	yes	yes	partial	...	...	...	18th „	
5	7th „	„ R. Coombs... ...	yes	...	36	7	Delicate	do.	5 7	S.	9 A.M.	¼	Barrack	...	Hospital, Dyspepsia	yes	yes	yes	yes	partial	yes	...	Hours 13	...	
6	30th „	„ C. Prior	yes	...	21	7	Delicate	do.	9	S.	10 A.M.	½	Barrack	...	Hospital, continued fever.	yes	yes	yes	yes	yes	...	...	...	17th Sep.	Since invalided.
7	2nd Sep.	C. Taylor's child	yes	...	3 8	10	Good.	...	3 8	...	4 P.M.	1	Staff Serjeant's Quarters.	Staff Serjeant's Quarters.	...	yes	yes	yes	yes	yes	...	yes	13	...	Death preceded by convulsions and left hemiplegia.
8	7th „	O. R. C. Sergt. T. Walsh ...	yes	...	24 7	10	Good.	Tempt.	3 5	M.	6 A.M.	1	do.	Old school house.	...	yes	yes	yes	yes	yes	...	...	...	7th Oct.	Since invalided.
9	8th „	Eliz. J. Butcher's child ...	yes	...	1 8	3	Delicate	...	1 8	...	6 A.M.	1	do.	Staff Serjeant's Quarters.	...	yes	yes	yes	yes	yes	yes	...	15½	...	Death preceded by convulsions and left hemiplegia.

Table showing the total Admissions and Deaths from Cholera and Choleraic Diarrhœa in the Head Quarters and Right Wing 76th Regiment at Thayetmyoo, from 9th May to 8th September 1869.

——	Men.	Women.	Children.	Total.
Admitted	12	5	6	23
Died	4	3	6	13
Recovered	8	2	...	10

NOTE.—There was only one admission from "Choleraic Diarrhœa," and that proved fatal in the person of the wife of the Regimental Schoolmaster.

Origin and progress of Cholera in Thayetmyoo in 1869.

38. At the commencement of this report I have stated that cholera seemed to originate in the Cooly village, in the month of April 1869.

I am unable to discover after careful inquiry that the disease was imported into the village. The Assistant Commissioner (*vide* his letter in the Appendix) says the disease originated there. The Native residents (*vide* Appendix) say it was considered by themselves and their priests or Poonghees to arise from the great heat of the weather, causing fermentation of the blood. I have further expressed my opinion that the disease was somehow or other conveyed to the 76th barracks from the village.

The origin of the second and third outbreaks I can merely account for from the accepted fact, that cholera, once establishing itself in a locality in an epidemic form for a certain period, is apt to suddenly disappear and as suddenly to re-appear at intervals of a few weeks, so long as the disease exists in the neighbourhood, so long, in fact, as the epidemic influence, whatever that may be, remains. This is neither a scientific nor satisfactory explanation, but it is no less consistent with facts, which have been recorded by many experienced observers.

Theories advanced at Thayetmyoo by amateurs.

Well in rear of 76th Canteen.

39. Many theories were advanced by non-professional amateurs as to the cause of cholera and its preference for the barracks of the 76th Regiment. The only one worthy of notice was the idea that the disease might have been fostered by the use of water, drawn from a well in rear of the Canteen of the 76th Regiment and in the vicinity of No. 10 married bungalow, and near to which two old closed-up cess-pits existed. The one cess-pit is thirty-six yards, the other fifty-four yards from the well. When in use, these cess-pits were employed in connection with an old disused privy, demolished last year, for the reception, I am told, of both solid and fluid excreta, but were filled up with earth, charcoal, &c., and closed in March or April 1863, and have never been disturbed since, over six years ago. Their depth is supposed to have been from forty to fifty feet, and it is quite consistent with our knowledge of these matters to believe, that a well situated so near them as the one in question would have its water contaminated. Since the 12th August 1869 it has been closed, and samples of the water forwarded to Madras for analysis, there being no means of doing so at this station. The result* of the analysis is not yet known.

My own belief is that the use of the water from this well had no bad influence on the health of the troops. It was used from the arrival of the 76th Regiment in February 1868 till August 1869, (when it was closed) by the following persons, viz :—

Serjeants' Mess, 76th Regiment.
Staff Serjeants, do.
Canteen, do.
Band, do.
No. 10 married barrack, do.

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* The result has since been communicated, and water pronounced good. *Vide* "Analysis" in Appendix, Section IV.

With the exception of the inhabitants of No. 10 married barrack, who suffered from cholera in May 1869, none of the others mentioned above were attacked up to the time the well was closed.

Localization of the disease in 76th lines.

40. There is no doubt that the disease confined itself mainly to a fixed radius in the lines of the 76th. I cannot account for this preference for one locality; this fondness for localization, however, is often met with during epidemic visitations, and is evidently one of the peculiarities of the disease.* Perhaps there existed in the vicinity of the buildings, more particularly affected with cholera, some organic substance, which has the property of assisting the propagation of the poison, and afterwards, for a time at least, maintaining it in a state of activity. What this substance or influence or atom may be has yet to be discovered.

Speculation as to the cause of localization.

I have stated before that, as far as ocular examination went, there was nothing of an insanitary character to be discovered in the buildings attacked, or in their vicinity. Should the scourge visit the Cantonment next year, it will probably select a different site for its ravages.

41. With regard to the epidemic which raged in the native town from 8th August to 5th September and which has been previously noticed, I have not much to add, except that I think it is possible, if no cases occurred prior to the first named date, that the disease was introduced among the inhabitants by the man who arrived from Prome on the afternoon of 6th August, and died of cholera the same night, but not probable ; I think it was merely a coincidence. On the other hand it may be said that the disease advanced steadily southwards from the " Cooly village" in a straight line and in the natural course of its progress attacked the native town. If so, its progress was very slow, considering the close proximity of the localities and the constant uninterrupted daily communication between them.

If this theory is adopted, then we must state it as follows, viz. :—Cholera appeared in Cooly village about the 12th April; in the barracks 76th on 9th May; lay dormant there from 29th May till 30th July, when it re-appeared in 76th Hospital, and finally broke out in the native town on the 8th August. For my own part I consider this line of reasoning quite fallacious, as I have ascertained that cholera raged in the city of Mandalay during the months of July and August, if not earlier, and also in three villages beyond the frontier, viz., Pokokkon, about 100 miles N. W. of Thayetmyoo; Myenggan, about 150 miles N. E., and Myentha, about 100 miles N. W. It also existed in the month of July in seven villages in the Prome District to the east of Thayetmyoo and on the opposite bank of the river. The names of those places with the dates and number of cases will be found in the Assistant Commissioner's letter (*vide* Appendix.)

42. The communication between Mandalay and Thayetmyoo is by means of steamers, both Burman and British, which ply on the Irrawaddy regularly between the Burman capital and Rangoon once or twice a month, conveying passengers and merchandise. Native boats in large numbers are also constantly passing to and fro.

No attempt at Quarantine, or even at Sanitary Inspection of the vessels named, seems to be made at Thayetmyoo. It is therefore more than probable that those vessels have been the means of scattering the disease far and wide over the province.

The Assistant Commissioner, in his letter (*vide* Appendix) states that there is very little intercourse between the villages to the east of Thayetmyoo because they lie on the east side of the river. It is not necessary to have frequent intercourse between places to carry cholera from one to the other; the disease may be conveyed by a single individual. I regret that I

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* The localities affected by cholera in 1869 were almost precisely the same as those which suffered in 1863, when H. M.'s 3rd Battalian 60th Rifles occupied Thayetmyoo. Cholera then began in the barracks nearest the river, and was localized to the barracks of the British Regiment. The Native Troops and Burmese population escaped entirely. The out-break in 1863 began on the 27th April. In 1869 (in the cooly lines) on the 12th April; and in 1870, the present year, when the epidemic was most virulent the first case occurred on the 7th April.

W. R. C.—*Sanitary Commissioner.*

am not at present in a position to give anything like a satisfactory account of the progress of the disease in upper Burmah and in the British province in which Thayetmyoo is situated. I find it next to impossible to get accurate information, especially with regard to upper Burmah. It is said the King endeavours to suppress all reports on the subject in Mandalay and the surrounding country, hence much that is communicated to us is mere hearsay, and therefore of little value. I see no way of obtaining this information unless Government sets an inquiry on foot through the Chief Commissioner of British Burmah, and the British Resident at Mandalay, and considering not only the interest, but the vital importance of the subject, I think the suggestion is worthy of consideration. All the information I have been able to gain with regard to the disease in the Prome District will be found in the Assistant Commissioner's letter before alluded to (*vide* Appendix.)

Treatment of Cholera.

43. With regard to treatment, I have nothing new to offer. I consider quinine, moderate use of stimulants, and judicious nourishment most valuable in the stage of malaise; and opium with astringents in the premonitory diarrhœa. When rice-water evacuations are clearly established and collapse is setting in, the less medicine given the better. At one time I used to give Calomel grs. ii. Soda Bicarb., and Potass. Chlorat.,—āā grs. X. every hour until symptoms of re-action began to show. Latterly I have discarded this treatment as useless.

The chief object is to relieve thirst by ice, cold water and effervescing draughts; cramps by frictions; and excessive vomiting by sinapisms or the external application of Chloroform (a few drops sprinkled on hot flannel and applied to epigastrium); occasionally it may be advisable when irritability of stomach is very distressing to give Creasote or Chloroform internally in small doses. It is also necessary to keep up the warmth of the body by artificial heat and to support the strength by beef tea with arrowroot and such like, judiciously given. Stimulants must be administered sparingly and with great care and discrimination in this stage, otherwise they will do much more harm than good. Diffusible stimuli are more manageable than preparations of alcohol. The wet sheet has been recommended in this stage and well spoken of; I have not tried it but can believe it to be useful.

In the stage of re-action or secondary fever, the treatment chiefly consists in the administration of diaphoretics, diluents, mild aperients, and quinine, with suitable nourishment. Where congestion of the kidneys and uræmia threaten, diuretics with fomentations and dry-cupping over the loins. All violent remedies must be carefully avoided in this stage as in the former. Cerebral complications must be treated as they arise, with ice to the head, counter-irritation, and such like.

Convalescense from severe attacks of cholera is often tedious. In the recent epidemic in the 76th Regiment almost every patient who recovered suffered from a painful eruption of boils on the face, trunk, and extremities. In one instance severe otitis and parotitis occurred as a sequelæ from which the patient, a woman, took a long time to recover. Change of climate is frequently desirable and necessary to restore health after an attack of cholera. Four men of the 76th have been this year invalided on that account.

Sanitary precautions and preventive measures to be observed during an epidemic of cholera.

44. The principle sanitary and preventive measures adopted during the existence of cholera in the 76th Regiment at Thayetmyoo, have been referred to already in this report when detailing the progress of the disease. There are, however, one or two points which I wish to speak of more fully in detail.

Rations.

1st. With regard to the food of the troops at Thayetmyoo, although the quality of the rations is good, and the quantity probably sufficient, yet there is a great want of variety. Beef is the article furnished daily. Mutton being only issued twice a year, namely, on Christmas-day and new year's day, owing to the expense of keeping up a supply of sheep. Mutton is issued to the Hospitals every second day, and is of excellent quality. Salt pork or salt beef is issued once a fort-night, but the men don't seem to care about it. Potatoes are issued as regularly as they can be procured, or in lieu of them,

preserved potatoes, sweet potatoes, yams, pumkins, and onions, but in the cold season, when in India, carrots, turnips, peas, cabbages, cauliflower, &c., are in most places abundant, in Thayetmyoo, no Europe vegetables are procurable for the troops. They would grow well enough as is proved in Officers' private gardens.

In the hot and damp months from May to October, when all feel more or less depressed, the appetite is very apt to pall at common food. If such is the case with those whose means enable them to purchase luxuries, what must it be with the private soldier ? Men who are at all delicate, loathe the constant beef ration, and eat all sorts of things to satisfy the caprices of their appetites. Some live for weeks on cheese and sardines and such like, which they buy from the Regimental coffee-shop. Eggs, fowls, milk, and butter are, as a rule, more expensive here than in India.

During the height of cholera this year, I supplied several delicate men in barracks with comforts from Hospital as recommended and sanctioned in the pamphlet entitled "measures for the prevention of cholera among European troops in Northern India," page 30, paragraph 522. This system I am confident, was attended with much benefit.

Cooking.

2nd. The cooking, although not worse than in many Indian stations, yet is very indifferent, and will continue so until proper cooking ranges are introduced. Duff's range has, I believe, been long since recommended; but as yet there is no sign of its being supplied.

I took occasion during the recent epidemic to draw the attention of the Officer Commanding 76th Regiment to the short-comings of the native cooks, and pointed out some objectionable practices of theirs which might, by a little pressure be prevented. Strict orders were given by the Commanding Officer on the subject in accordance with my suggestions.

3rd. Hot coffee or tea has always been available early in the morning for such men as chose to go to the Regimental coffee-shop for it. During the existence of cholera, however, the Commanding Officer made arrangements by which the beverages could be had close to the parade ground, so that no man should have any excuse for saying his barrack was too far from the coffee-shop, and that he had no time to go to it before parade. The price charged for each cup of coffee or tea was half an anna. I suggested the issue of coffee to men on night sentry, as a prophylactic measure. This was given gratuitously, the expense being, I believe, defrayed out of one of the Regimental Funds.

Flannel Belts.

4th. I recommended flannel abdominal belts to be worn, especially at night. Regarding these belts I would observe that they are usually made of much too thick and heavy material, consequently, many who wear them, (especially in the day time,) find them so oppressively hot, that they are very apt to suddenly throw them off, and by so doing to expose themselves to a chill, and are therefore much more likely to suffer injury than if they had gone without them altogether. If made of a lighter material, they would be equally efficacious, and not so open to objection as the pattern at present issued.

Disinfection of barracks, latrines, bedding, &c.

5th. With regard to the disinfection of barracks, latrines, and other out-buildings, to the purification of bedding and clothing, and, when necessary their destruction by burning, the rules laid down for guidance on those points were strictly adhered to. The same remark applies to the abandonment of infected buildings and encampment at a distance of the occupants; the isolation of cholera patients, and the disposal of cholera evacuations.

Employment of Natives in attendance on cholera patients.

6th. When the first outbreak took place in May last in the 76th Regiment, there was difficulty in getting Natives as attendants on cholera patients, consequently European Orderlies had to be employed. Latterly, however, this difficulty was not experienced, and it was found unnecessary to employ European Soldiers any longer in that capacity.

7th. When cholera made its appearance in the 76th Regiment in May 1869, I reported to Dr. Shelton, Principal Medical Officer, British Medical Service Rangoon, the insufficiency of camp equipage in store at Thayetmyoo should it be necessary to place any number of men under canvass.

Insufficient supply of camp equipage at Thayetmyoo.

I was aware that a certain portion of the camp equipment had been sent to the experimental sanitarium at Nyoung Gyo for the use of the troops temporarily occupying that spot, but was convinced that, even had the full complement allowed to this garrison been present in the Thayetmyoo Arsenal, it would have been insufficient to meet the requirements.

The result of this reference will be seen on perusal of the following copy of a letter of a serious outbreak of cholera. Dr. Shelton reported the circumstances to Inspector-General Hadaway in Madras, by whom the matter was referred to the Commander-in-Chief through the Quarter Master-General.

From the Quarter Master-General, to the Inspector-General, British Medical Service.

In returning the enclosures of your letter, No. 204, dated 1st June 1869, I have the honour, by order of the Commander-in-Chief, to inform you that the allotment of camp equipage at Thayetmyoo and Tonghoo has been fixed at half equipment, and that His Excellency is not disposed to ask Government to increase that scale.

At page 13, paragraph 471 of the pamphlet "Measures for the prevention of cholera among European Troops," published in 1864, under the head "Supply of Camp Equipage," are the following remarks:—"Although, if the measures we recommend are carried out, the encampment of the whole of the European Forces at any station will perhaps not often be necessary at one time, we must nevertheless anticipate this possibility. The ordinary supply of camp equipage will not always be sufficient for these emergencies.

"The number of tents allowed for each Regiment is calculated at the rate of sixteen men per tent, but, when beds are put into them, not more than eight men can be accommodated in each."

"Even if no beds were taken this number ought hardly to be exceeded, we recommend that the proper authorities be required to report upon the best and most economical way of providing the additional camp equipage required for each station," &c.

On the 9th August 1869, during the second outbreak of cholera in 76th Regiment, the following Telegram was received by the Brigade-Major from Dr. Shelton, viz.:—

"Inspector-General, British Troops, recommends by telegram that should other cases of cholera have occurred in 76th, that Regiment be sent into camp at once."

The Brigade-Major's reply was as follows, viz.:—

"General Nott and Surgeon Thomson think it unnecessary to camp 76th foot.

"Thirty-one tents, European, in store; of this number deduct ten required at Cholera Hospitals and Ordinary Hospital and Quarter Guard in camp and Cholera Hospitals in Cantonments, leaves twenty-one tents, European, which will accommodate 168 men, 76th, in camp with their cots, this being middle of monsoon.

"Providentially everything promises well, but in event of severe epidemic, 190 men, all the Artillery, and all women and children must face the crisis in barracks."

Further comment on this state of affairs is hardly necessary.

At the date of the telegram, cholera was just commencing in the Native Town, and it was impossible to say at what moment a fierce outbreak might have taken place among the troops. Had such been the case, our condition would have been simply deplorable. Providentially everything did turn out well. I do trust, however, that this matter, which is

one of such vital consequence to the garrison of Thayetmyoo, will attract the notice of high authority, and that before next hot season we may have such a supply of tents provided as will relieve our minds of all anxiety, at least on that score, should another epidemic of cholera unhappily assail us.*

Cholera Camps near Thayetmyoo.

8th. Two spots were used for encamping the families attacked with cholera this year, namely, an open space inside the redoubt† and the brigade exercising ground. Of the former I do not approve, as it is too confined and is not sufficiently isolated. The latter answers very well for a preliminary camp. A regular camping ground was chosen a year or two ago on the top of a hill to the north of the station. The soil is gravelly. The site is covered with trees and underwood. The underwood should be always kept clear in anticipation of the camp being occupied. It commands a fine view of the Irrawady and is altogether a cheerful locality. It is distant 2,600 yards from the northern boundary of the Cantonment and is 100 feet above high-water mark. There is ample room to encamp the whole European garrison on the ridge, if necessary. Abundance of good water can be obtained all the year round from a creek of the Irrawady which runs up to within a short distance of the foot of the hill. Access to this camp has hitherto been only possible for men on foot, ponies, or elephants, but not for wheeled vehicles, except perhaps the rough country carts. A good driving road, however, is now under construction and will shortly be completed.

A 2nd Cholera Camp across the Irrawady very desirable.

The station of Thayetmyoo is situated in a sort of amphitheatre; a range of low wooded hills bounds it on the south, west and north sides, and the river Irrawady on the east. It covers a space which is much circumscribed, and as there are no roads beyond mere rough tracks into the interior and on the high grounds, great difficulty in obtaining a ready and good supply of water is experienced, there is very poor opportunity afforded for selecting sites for cholera encampments. At present, as I have just stated, there is but one. It is obvious however, that one camp is insufficient, as, should at any time a serious epidemic of cholera rage amongst the troops, it might, and in all probability, would be found necessary to move in various directions. I would therefore strongly recommend the selection of one or two new sites on the other side of the river. I believe there is an excellent site at no distance from the bank, which was recommended to the notice of the authorities over two years ago by the Committee which selected the camp on this side of the river, but this good suggestion has not yet been adopted. I beg to bring this point also specially to notice. The advantage of crossing rivers to escape from cholera has frequently been pointed out by writers on the subject, and recently has been particularly insisted on "whenever practicable" by Inspector-General Beatson, M.D., C.B., British Medical Service, and Inspector-General Murray, Indian Medical Service.

NOTE.—The river was crossed in the outbreak of April 1870 and cholera soon after subsided, but whether on account of the locality being changed, or the normal progress of a cholera outbreak it is difficult to say.
W. R. C., *Sanitary Commissioner.*

Absence of Sanitary precautions on the river Irrawady.

9. I have previously stated that there is constant communication between upper Burmah and Thayetmyoo by steamers and native boats which ply on the Irrawady; I have also pointed out that cholera was known to rage at Mandalay this year, and probably at many of the Villages on the river bank, but that so far as I could ascertain no special attention was paid to the fact or care taken to inspect the steamers or boats, with a view to ascertain their sanitary condition. I consider this state of things represents an important defect in our sanitary administration in this part of the world, and therefore desire to bring it publicly to notice with a view to its remedy.

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* A most severe out-break of cholera occurred again this year at Thayetmyoo, during which 26 persons of the 76th Regiment died. The effect of removal to camp will fall to be considered in the Report for Epidemic Cholera for the current year.

† The "redoubt" was the one spot in 1863 unaffected by cholera.—W. R. C., *Sanitary Commissioner.*

The residents at Thayetmyoo are exposed to danger by these vessels, as are also those at Prome and the other British stations including Rangoon. When cholera was present in the 76th Regiment we were forbidden to send our Invalids or time expired men to Rangoon until a certain period had elasped since the last case, as it was thought we might communicate the disease to the troops in Rangoon. The precaution was undoubtedly a wise and proper one on the part of the Principal Medical Officer, British Troops. At the same time however, free communication was permitted by the Civil authorities between all stations along the river banks without let or hindrance, and I have no doubt that the disease was disseminated among the population in that way, although I have no facts to prove the assertion.

That the sanitary condition of all the vessels, and especially of the flats belonging to the Irrawady Flotilla Company in which our Soldiers are conveyed, requires strict supervision, the following letter which I found it necessary to address on the subject to the Brigadier-General Commanding at Thayetmyoo, abundantly proves :—

From Senior Medical Officer, British Medical Service, Thayetmyoo, to Brigade-Major, Thayetmyoo dated Thayetmyoo, 17th September 1869, *No.* 120.

"I have the honour to report for the information of the Brigadier-General Commanding, that I inspected the steamer "Colonel Phayre" and its flat, this morning, with a view to ascertain the nature of the accommodation provided for the details, R. A., and 76th about to proceed to Rangoon, viz :—

Transfers and Time Expired	16
Invalids	20
Women	7
Children	9
Total	52

with an Officer in command, a Hospital Dresser in Medical charge and a Staff of native followers.

2. I was surprised to find that only a portion of the upper deck of the flat had been set apart for the troops.

It cannot be stated that they have the use of the whole upper deck, inasmuch as a considerable portion of one end is screened off for the use of cabin passengers, and no small space at the other end is taken up by sheep and fowl pens and a cooking galley.

3. It is therefore impossible that there can be sufficient deck room left to provide accommodation for a screened hospital to hold four men and a dresser, a screened berth for the married people, another for a Staff Serjeant, and at the same time give each man the full amoant of space allowed by regulation.

4. The state of the main deck of the flat, I consider to be in a sanitary point of view, highly objectionable. It is crowded with natives and their families and merchandise, and in addition to the human freight, conveys no less than sixteen ponies. If bad smells are proofs of faulty sanitary arrangements, then the state of this deck must be bad indeed, for the stench which proceeds from it is simply abominable.

5. I am well aware that every care is exercised by the Commander of the steamer to keep his decks sweet and clean, but I cannot see how it is possible to do so under the circumstances mentioned.

6. At a time like the present when we have cholera hanging over us and ever and again breaking out, when, and where least expected, it is more especially necessary to enforce the strictest attention to sanitary measures, and where can it be more essential than on board vessels crowded with natives.

7. From all accounts the city of Mandalay, whence the "Col. Phayre" has just arrived, is infected with cholera and has been so for some time. Hence an additional reason why stringent sanitary rules should be enforced in these river steamers and flats.

8. I beg to record my opinion that when troops, and especially invalids, are being sent to Rangoon, from this station, neither natives nor horses should be permitted as passengers on board the same flat.

9. I would further recommend that in future it should be insisted on that the proper space allowed by Government to each man be invariably provided.

10. Were it not that our invalids and time-expired men have been already twice prevented from starting on account of cholera, I should have considered it advisable on this occasion to recommend that they be detained until proper means of conveyance was found for them. The voyage is likely to be a short one and it is to be hoped all will go well. Nevertheless, I must state my conviction that it is attended with risk, and in that case, of sickness breaking out on board, it would be advisable to send a Medical Officer in addition to the Hospital Dresser.

11. In conclusion, I have the honour to request that this letter may be forwarded to the divisional authorities and submitted for their serious consideration in order that the whole subject of the transport of troops between Thayetmyoo and Rangoon be thoroughly investigated."

A copy of the above letter was forwarded to the P. M. O., Rangoon, who lost no time in bringing the subject to the notice of the divisional authorities.

NOTE.—Dr. Thompson's remarks on the condition of the Steamers and Boats navigating the Irrawaddy are of great importance, and particularly when it is considered that in British Burmah the rivers are the great highways of traffic and human intercourse.—W. R. C., *Sanitary Commissioner.*

ADDENDUM TO REPORT ON CHOLERA AT THAYETMYOO IN 1869.

Section I.—Evidence regarding Cholera in Coolie Village from residents of the same.

Section II.—Letter to Assistant Commissioner, Thayetmyoo, seeking information regarding Cholera in the Town and District, with his reply.

Section III.—Answers to queries contained in "Instructions for conducting an inquiry into Cholera in India" especially with reference to Section IV., "Movement of Cholera."

Section IV.—Results of Analysis of Water from a well near Canteen, 76th Regiment, at Thayetmyoo

Section V.—Map of the Cantonment of Thayetmyoo,

ADDENDUM.

Section I.

INQUIRIES MADE OF RESIDENTS IN COOLY LINES REGARDING THE CHOLERA EPIDEMIC IN APRIL 1869.

The Assistant Thugee or Headman of the Village, gave the following replies to queries put to him by me on 21st June 1869 :—

Question.—When did you first become aware of Cholera in Cooly Lines and on what date was the first case observed ?

Answer.—Fifteen days before the Toty's death, which occurred on 25th April, as far as I can recollect. Cannot say exactly the date.

The first case was a Bandy-man, a Burman. He died three days after he was attacked.

Second case, a Cooly in Public Works Department, attacked at 10 A.M., died at 8 P.M. of same day.

Third case, a Bandy-man, Mussulman, taken ill one night, died the next.

Fourth case, a Burman child, died within 24 hours.

Fifth case, a Burman girl about 5 years old, died within 24 hours.

Sixth case, a Burman Bandy-man taken ill and died within one hour.

Cannot give the dates of the above cases, nor am I sure that I have stated them in the order in which they occurred.

Question 2nd.—What made you believe it to be cholera ?

Answer.—The symptoms.

Question 3rd.—Did they get any medicines ?

Answer.—Native remedies.

Question 4th.—Why did you not immediately report the existence of cholera to the Assistant Commissioner or Civil Surgeon ?

Answer.—Got no instructions to make any report of sickness at that time. Has since received orders to do so.

Question 5th.—Who is the head-man in the Cooly village ?

Answer.—A Burman.

Question 6th.—Are you under no Cantonment laws or supervision ?

Answer.—None.

Question 7th.—If any resident (not a Regimental or public follower) got ill of any ordinary disease, to whom did he apply for aid ?

Answer.—They treated themselves with native remedies. Sometimes they applied to a Madrassee barber or village doctor, but he has died of cholera, so now they have nobody.

Question 8th.—How many cases of cholera do you think have occurred in your village on the present occasion ?

Answer.—I think about 16 or 17 cases, but am not sure.

Question 9th.—Of those cases how many died ?

Answer.—I think about 12 died.

Question 10th.—Of the fatal cases, how many were Men, how many Women, and how many Children ?

Answer.—I think 7 Men, 2 Women, 3 Children, died.

Question 11th.—What was done with their bodies ?

Answer.—All buried.

Question 12th.—Where were they buried ?

Answer.—Close to the village.

Question 13th.—Have you no distinct burial ground fixed by law ?

Answer.—None.

Question 14th.—What was done with the soiled clothes and bedding of those who died from cholera ?

Answer.—They were thrown out in the neighbouring jungle and left there and some were thrown out by the graves. Nothing was done with them until Dr. McAllum (Civil Surgeon) and yourself had some soiled bedding burned which you found at the burial place the day you came there.

Question 15th.—What was done with the cholera stools and vomit. If received in vessels or chatties what was done with them. If the sick person relieved himself on the floor of his hut what was done ?

Answer.—They were generally just swept away. Sometimes covered with sand. No vessels or chatties were used.

Question 16th.—Were cramps severe in the several cases ?

Answer.—Some had cramps, others none.

Question 17th.—Was suppression of urine observed ?

Answer.—Do not know.

Question 18th.—Did any die after getting warm and all vomiting and purging had ceased ?

Answer.—Thinks all died in cold stage.

Question 19th.—Did the other people in the village suffer from diarrhœa at this time?

Answer.—Many were afraid and were suffering from diarrhœa. Two or three ran away and crossed the river from fright. One came back a day or two after to the village and died of cholera. The others returned lately and are well.

Question 20th.—Have you got privies in your compounds?

Answer.—No; go to the jungle or nullah close to the village, or to the river bank to relieve nature.

Question 21st.—Whence do you get your drinking water?

Answer.—We have no well; some dig holes in the sandy bed of a branch of the river close at hand; some go to a well in the Lascars' Lines; others subscribe and get a bandy and water-cask and send to the river.

Question 22nd.—Were any of the residents in Cooly village employed in April this year in bricking the ground floor of the 76th married barracks?

Answer.—No, the coolies and work-people employed on the married barracks came from a Burmese village and not from the Cooly village.

Question 23rd.—How many years have you lived in Cooly village?

Answer.—Twelve years.

Question 24th.—How often has cholera visited the village during that time?

Answer.—Three times, including the outbreak in April this year 1869.

Question 25th.—In what years did the first and second outbreaks of cholera take place?

Answer.—First in 1857; second in 1862.*

Question 26th.—In what months of the year did the first and second outbreaks you mention occur?

Answer.—They each occurred later in the year than the one this year in April,† but I do not recollect the exact months.

Question 27th.—To what do you usually attribute the appearance of the disease?

Answer.—To nothing particular; I consider it "fate."

Question 28th.—Did you attribute the appearance of cholera this year to any particular cause?

Answer.—No; the village people and Poonghees (priests) say it arose from the great heat of the weather, producing fermentation of the blood.

Question 29th.—Do you think any one coming from some other place could have brought the disease to your village this year?

Answer.—No; I do not think so.

Question 30th.—Do you take any measures to drive away the cholera?

Answer.—Yes; we tap or beat the posts of our houses with a piece of wood.

Question 31st.—Have you any medicines good for it?

Answer.—None.

Question 32nd.—Do you think it is contagious?

Answer.—The Burmese think so; they leave a house infected with cholera and never return to it.

Question 33rd.—Do you think that eating bad food or drinking foul water would give cholera?

Answer.—The Burmese think so.

Question 34th.—Was there any cholera in the neighbourhood of the Cooly village in April last?

Answer.—I heard of none.

NOTE.—The individual from whom the above information was obtained is a native of India. It will be observed that in replying to certain questions he quotes the opinions of the Burmese, but avoids giving his own ideas on the subject.

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* This must be a mistake. The latter epidemic occurred in the year 1863.—W. R. C.

† The 1863 outbreak occurred in April, but later in the month than the one in 1869.—W. R. C.

When cholera appeared in the native town of Thayetmyoo, the Burmese fired guns rockets, and such like and beat gongs and tom-toms, and made all sorts of horrible noises to frighten away the demon god who was supposed to have something to do with the prevailing epidemic.

With regard to native remedies I may mention that when visiting the Cooly village along with the Civil Surgeon in April 1869 during the prevalence of cholera, I saw a Burman administering medicine to his wife who was in the second stage of the disease. On examination, the medicine proved to be simply a solution of common salt in water, of which he gave her a mouthful occasionally out of a tumbler. I believe the woman eventually recovered, whether her recovery was attributed by her friends to the saline treatment or not, I cannot say. I could not find out where the Burman got the idea of the salt and water.

The following replies were made by the Regimental Cutwal who resides in the "Cooly village" to certain questions put to him :—

Question 1st.—How many followers belonging to 76th Regiment live in the "Cooly village" including yourself?

Answer.—Thirty-one.

Question 2nd.—Enumerate them?

Answer.—1 Cutwal.
10 Cooks.
8 Bheesties.
8 Sweepers.
4 Toties; (1 toty died and another came in his place.)

Question 3rd.—A toty died of cholera on 25th April, can you give me any account of his case?

Answer.—None.

Question 4th.—When did you first become aware of cholera in "Cooly village?"

Answer.—Six days before the toty died.

Question 5th.—On what date did the first case occur?

Answer.—I don't know.

Question 6th.—What made you believe the disease was cholera?

Answer.—The people all called it so.

NOTE.—The other questions and replies are similar to those recorded in connection with the examination of the Assistant Thugee, and as they elicit no new facts, need not be repeated.

I have ascertained from the Medical Officer in charge of the Royal Artillery at this station, that in April 1869 there were five native followers of the Battery residing in the "Cooly village," viz.:—3 Toties 1 Horse-keeper 1, Grass-cutter.

I am happy to state, that since writing the remarks on the state of the cooly village in the body of the preceding report, active measures have been taken by the Civil authorities towards the removal of the said village altogether.

Section II.

Copy of a letter addressed to the Assistant Commissioner of Thayetmyoo seeking information regarding the origin and progress of cholera in the town and district, also a copy of his reply, which latter is frequently alluded to in the preceding report:—

From Senior Medical Officer, British Medical Service, Thayetmyoo, to Assistant Commissioner Thayetmyoo, dated 23rd September 1869, No. 128.

Having been called upon by the Inspector-General of Hospitals, Her Majesty's British Medical Service, Madras, to report, for the information of Government, on the recent outbreaks of epidemic cholera amongst the European Troops at this station, and in connection therewith to give full particulars as to the existence and progress of the disease among the Native

population, not only in the immediate vicinity of Thayetmyoo Cantonment, but also in the surrounding country. I have the honour to request that you will favour me at your early convenience with brief replies to the following Queries, viz :—

1*st.*—The first appearance of cholera in the neighbourhood of Thayetmyoo this year (so far as I can ascertain) appears to have been in the Cooly village just outside the northern limit of the Military Cantonment in the month of April.

(*a.*) Do you know on what date the first case occurred in Cooly village ?

(*b.*) Was the disease supposed to have originated in Cooly village, or to have been imported from any other locality at the time believed to be infected ?

(*c.*) How many persons (adults and children, in all were attacked with cholera this year in cooly village ?

(*d.*) How many died ?

(*e.*) On what date was the last case reported in cooly village ?

(*f.*) Has the cooly village been visited by cholera annually, or at irregular periods during the last five or six years ?

(*g.*) Have its residents been subject periodically to severe attacks of fever, dysentery, or diarrhœa ?

(*h.*) What was the population of cooly village at the commencement of the outbreak in April 1869 ?

(*i.*) What has been the average population of the village for the last five or six years ?

2*nd.*—On the 7th August 1869 you reported to the Brigade Major the death of a Burman, which had occurred in the Native town of Thayetmyoo on the previous night, and which was supposed to have been the result of cholera. Further, that the individual had only arrived from Prome a few hours before his death, and had been ill for two or three days.

(*a.*) On what grounds was the man alluded to supposed to have died of cholera ?

(*b.*) Was cholera at that time (beginning of August) existing at Prome, or at any other town or village on either side of the river Irrawaddy between Prome and Thayetmyoo, at which the deceased might have called on his way up ?

(*c.*) Was deceased an iuhabitant of Prome or of Thayetmyoo ?

3*rd.*—On the 8th August 1869 three cases of cholera were reported in the Native town of Thayetmyoo by the Civil Surgeon.

(*a.*) Do you know if either of those individuals had been in communication with the Burman, who died on the evening of 6th August, or with any of his friends or party ?

(*b.*) Did cholera break out on 8th August iu or near the part of the town where the aforesaid Burman from Prome died on 6th August ?

(*c.*) Was this outbreak on 8th August the first intimation of the existence of cholera in the Native town of Thayetmyoo this year, or are any cases supposed to have occurred before that date ?

(*d.*) The disease appears to have lasted in the Native town from 8th August to 5th September ; did it confine itself to one locality, or was it erratic in its courses ?

(*e.*) Since the disappearauce of cholera from the town on 5th September (date of last case) has it broken out in any other part of the district ?

(*f.*) If so, please mention the place, with its direction and distance from Thayetmyoo and if there is regular communication between the two places ?

4*th.*—Has cholera occurred this season in any other towns or villages in the Prome District prior to or since 8th August ?

(*a.*) If so, please state the name of each place, with its direction and distance from Thayetmyoo ?

(*b.*) Also, the date on which it appeared in each place respectively, and if frequent intercourse was and is kept up between each locality and Thayetmyo ?

(*c.*) Also the number of cases and number of deaths in each place ?

5th.—Are you aware if cholera has existed this year in any of the towns beyond the frontier on either bank of the river Irrawaddy, or in the interior, excluding Mandalay ?

(*a.*) If so, please state the name of each place, with its direction and distance from Thayetmyoo ?

6th.—It has been currently reported that cholera has raged for some time back in the city of Mandalay, and has not yet entirely abated ?

(*a.*) Is this report correct ?

(*b.*) If so, do you know about what date cholera first appeared this year in Mandalay ?

(*c.*) Have you any means of ascertaining whether the disease originated in Mandalay, or was believed to have been imported ; if the latter, from whence ?

(*d.*) Can you state if Mandalay is subject to annual visitations of cholera ?

(*e.*) Considering the constant communication by steamers and Native boats between Thayetmyoo and Mandalay in connection with the doctrne much believed in now-a-days that cholera is transmissible by such means, are any measures of precaution adopted by the Civil authorities at Thayetmyoo, when cholera is known to prevail at Mandalay or any of the towns on the river-bank, such as inquiry into the health of passengers and crews arriving from those places, inspection of the sanitary condition of vessels, and such like ?

(*f.*) Can you inform me if any cases of cholera have been reported this year as having occurred on board of any vessels trading between Rangoon and Thayetmyoo, or between Thayetmyoo and Mandalay ?

(*g.*) If so, please give the dates and the places of their occurrence, and whether fatal or otherwise ?

7th.—From your experience of this district and station do you think that the present year has been exceptional as regards climate, viz., temperature and rain-fall, and have you observed whether the Natives have been on the whole more subject to disease this year than usual ?

The Assistant Commissioner's reply to the foregoing letter is as follows :—

To Dr. THOMPSON, Senior Medical Officer, British Medical Service, Thayetmyoo, dated Thayetmyoo, 12th October 1869, No. 363.

I have the honour to submit replies as follows to the queries in your letter, No. 128 of 23rd September 1869 :—

1st.—(*a.*) On 14th April.

(*b.*) Supposed to have originated in the cooly lines.

(*c.*) Twelve persons in all.

(*d.*) Nine died.

(*e.*) 1st May.

(*f.*) Has not been visited with cholera during the last five years.

(*g.*) No, as far as can be ascertained.

(*h.*) Two hundred and ninety-five.

(*i.*) About 325 ; but this average cannot be depended on, as till this year the population of the cooly lines had been included with Theegong village, which is about 100 yards distant.

2nd.—(*a.*) Because he died from purging, vomiting, and spasms, and it was reported as cholera at the time of his death.

(*b.*) Cholera was reported here to be at Prome ; but, as that is not within my jurisdiction, I am unable to speak positively, but there was none at that time in the villages on the river bank within my jurisdiction.

The deceased's brother stated that deceased was attacked after leaving Prome, and was ill in the boat for two or three days on the way up.

(*c.*) An inhabitant of Thayetmyoo.

3rd.—(*a.*) It is believed not, but cannot be positively ascertained.

(*b.*) No, in different parts of the town, and at places considerably apart.

(*c.*) The first intimation of cholera in the town was when the man, who came up from Prome, died on 6th August; previous to that there had been no cholera in the town during the past year.

(*d.*) Did not confine itself to one locality, but was erratic through the town.

(*e.*) No.

(*f.*) Last answer replies to this question.

4th.—Yes.

(*a.*) Thabyeezan Village, 18 miles east of Thayetmyoo.

Yayay	do.	14	do.	do.
Oshilkong	do.	21	do.	do.
Thonynazine	do.	40	do.	do.
Thitnyoo	do.	38	do.	do.
Setpangon	do.	28	do.	do.
Iswaydon	do.	30	do.	do.

Very little intercourse between these localities and Thayetmyoo. They lie on the eastern side of the river.

(*b.*) Thabyeezan	on 11th July,	terminated	on	9th August.
Yayay	,, 11th do.	do.	,,	14th July.
Oshilkong	,, 10th do.	do.	,,	23rd do.
Thonynazine	,, 23rd do.	do.	,,	6th August.
Thitnyoo	,, 9th do.	do.	,,	28th July.
Setpangon	,, 9th do.	do.	,,	3rd August.
Iswaydon	,, 10th do.	do.	,,	15th July.

(*c.*) Thabyeezan	Village,	Cases 24,	Deaths	20.
Yayay	do.	7,	do.	4.
Oshilkong	do.	8,	do.	8.
Thonynazine	do.	2,	do.	2.
Thitnyoo	do.	15,	do.	10.
Setpangon	do.	9,	do.	9.
Iswaydon	do.	7,	do.	6.

5th.—Yes. It is stated to have existed at Pokakkoo, Myen-Gyan, Myen-Tha, Villages.

(*a.*) Pokakkoo, about 100 miles north-west of Thayetmyoo.

Myen-Gyan, about 150 miles north-east of Thayetmyoo.

Myen-Tha, about 100 miles north-west of Thayetmyoo.

6th.—(*a.*) Believed to be correct, but cannot speak positively.

(*b.*) No.

(*c.*) Can't say.

(*d.*) Can't say.

(*e. and f.*) No. I have never heard of any cholera in the boats coming down which I should do if there was cholera, as they stop here for their Custom-house pass.

I only heard of one case on a Burmese Steamer going to Rangoon; the patient received medical aid from the Civil Surgeon while the steamer remained, and I believe recovered.

(*g.*) I am unable to give the date of the only case I heard of; it was a considerable time ago.

7th.—Yes. There has been much less rain than usual. The weather has been unusually hot, and there has been, I think, more sickness than usual this year.

Section III.

A copy of the printed "Instructions for conducting an inquiry into Cholera in India" was forwarded to me officially while engaged in writing the foregoing Report, and my attention was particularly directed with especial reference to the epidemic at Thayetmyoo to Section IV, page 5, "Movement of Cholera."

I shall now, therefore, endeavour to reply to some of the chief questions contained in the said Section.

Premonitions of Cholera.

1. There were no indications of an altered state of health among the unaffected inhabitants of Thayetmyoo, whether European or Native, when cholera was supposed to be approaching the station this year (1869), so far as I could ascertain.

2. Diarrhœal affections and fevers were unusually prevalent in the Wing 76th Regiment, viz., in May, July, August, and September 1869, but not prior to those dates, or, *i.e.*, when cholera may have been supposed to be approaching. In May especially the children of the corps suffered unusually from digestive and febrile affections. The attacks of acute (non-choleraic) diarrhœa accompanied by fever and cerebral disturbance among children were sudden and alarming, and in some instances rapidly fatal. Adults suffered to a less degree. The Royal Artillery had no unusual amount of sickness at this period, neither had the Native Troops, nor the Native inhabitants so far as I can learn.

3. There are other premonitions of cholera sometimes, but not always observable, viz. intense heat and feeling of oppressiveness in the atmosphere with absence of usual rain-fall. These phenomena were observed when cholera attacked the Cantonment this year.

Inquiry regarding the forms of Cholera.

Cholera presents itself under three forms, viz. :—(1) Sporadic. (2) Endemic and (3) Epidemic.

4. I believe them to be precisely similar.

5. Premonitory symptoms, as a rule, prevail among unaffected persons in localities where endemic and epidemic cholera occur, but not usually where sporadic cases are chiefly met with.

6. Theoretically there are many appreciable phenomena in the disease, in the locality, in the habits of the people, or in the nature of the seasons and atmospheric conditions, which might naturally be supposed to account for the existence of one form of cholera rather than another, or for the passage of one form into another. Practically, however, it is often found that phenomena, which are supposed to be most favourable to the production of cholera, such as crowded cities or villages, intense heat, partial rain-fall, impure water, accumulations of filth, and absence of everything in the shape of sanitary arrangements, may exist, and the persons subjected to such evil influences yet enjoy a wonderful immunity from endemic or epidemic cholera. Sporadic cases may occur amongst them and no more. Again, how often is it seen in a severe epidemic of cholera that the disease first selects what appears to be the healthiest and best regulated locality for its attack, passing over for a time spots reeking with filth. Sometimes even these unwholesome spots are left intact altogether.

I have always observed, however, that when the disease did eventually settle down on filthy bazaars and such like, its ravages were very severe, and its effects rapid and sweeping.

7. I might adduce theories to show why a sporadic case of cholera is not followed by other cases, but at present I cannot give facts to support such theories.

8. The same answer applies to the question, why an endemic outbreak does not become epidemic.

Influence of Sex and Age.

9. This question refers to persons living in a circumscribed endemic locality. Thayetmyoo is not considered an endemic locality, as hitherto, I believe, it has been subject only to epidemic visitations at irregular intervals.

The following statistics therefore are not given in answer to the question, but simply as matters of fact which bear indirectly on the subject, and are of some interest, viz. :—

The Head Quarters, and Wing, H. M.'s 76th Regiment suffered from cholera more or less from May to September 1869.

Average strength during that period...	Officers	10
	Men...	344
	Women	40
	Children	46
	Total...	440

of that number there were attacked with cholera and died of the same during that period:—

	Attacked.	Died.
Men	12	4
Women	5	3
Children	6	6
Total...	23	13

Note.—Of the 6 children 5 were females.

Per-centage of each Sex and Age Attacked and Died :—

Men.

Attacked 3·48 per cent. of strength of 344.
Died 1·16 do. do.
Per-centage of died to attacked 33·33.

Women.

Attacked 12·50 per cent. of strength of 40.
Died 7·50 do. do.
Per-centage of died to attacked 60.

Children.

Males attacked 4·76 per cent. of strength of 21.
Died 4·76 do. do.
Females attacked 20 per cent. of strength of 25.
Died 20 do. do.

All Children.

Attacked 13·04 per cent. of strength of 46.
Died 13·04 do do.
Per-centage of died to attacked 6.

Per-centage of attacked and died of Officers, Men, Women, and Children.

Attacked 5·22 per cent. to total strength 440.
Died 2·95 do. do.
Per-centage of died to attacked 56·52.

The Native Town of Thayetmyoo suffered from cholera from 8th August to 5th September 1869.

Population of Native Town on 1st August 1869, total 9,000, viz :—

	Men	2,672
	Women	2,795
Children...	Male...	1,799
	Female	1,734
	Total...	9,000

Of this number there were attacked and died of cholera the following :—

	Attacked.	Died.
Men...	12	8
Women	14	9
Children	21	17
Total...	47	34

NOTE.—Of the 21 children attacked, 9 were males and 12 were females.

NATIVE TOWN.—Per-centage of each Sex and Age attacked and died :—

Men.

Attacked ·45 per cent. in population of 2,672.
Died ·29 do. do.

Per-centage of died to attacked 66·66.

Women.

Attacked ·50 per cent. in population of 2,795.
Died ·32 do. do.

Per-centage of died to attacked 64·28.

Male Children.

Attacked ·50 per cent. in population of 1,794.

Female Children.

Attacked ·68 per cent. in population of 1,734.

Male and Female Children.

Died ·48 per cent. in population of 3,533.

Per-centage of attacked and died in population of 9,000 Men, Women, and Children.

Attacked ·52 per cent. in population of 9,000 Natives.
Died ·37 do. do.

Per-centage of died to attacked 72·34.

Influence of Temperament.

10. I should fancy persons of nervous temperament were more susceptible than others, but I cannot speak with confidence on this subject.

Influence of Diet.

11. Poorly fed and badly nourished persons one would imagine are more susceptible to cholera than those whose food is good and abundant.

Influence of Health and Habit of body.

12. Persons in delicate health and of weak habit of body are frequently attacked by cholera when it exists in a place, as for instance, patients in Hospital suffering from depressing diseases, such as fevers, secondary syphilis, &c. I have met with two marked instances of men suffering from constitutional syphilis (patients in Hospital) being attacked with cholera when the disease was epidemic; one suffered from Rupia the other from Cranial Nodes, both died.

At the same time strong healthy men are often cut down ; but I think as a rule, they are not so susceptible as the weakly ones.

Influence of Race.

13. I cannot say.

Influence of Occupation.

14. I cannot say.

It might be shown by statistics whether mehters employed in collecting and removing excreta during times when cholera prevails, suffer more from cholera, or only to the same extent as others living in similar localities.

I have no data on the subject. In my own small experience I cannot recollect a single instance of a mehter being attacked when specially employed to remove the excreta of cholera patients.

Occupations involving much fatigue and long marches are more or less conducive to an attack of cholera when that disease prevails in a locality, for the reason that such occupations tend to depress the system.

Influence of Intemperance.

13. I have not observed that the moderate use of spirituous liquors has any apparent influence or susceptibility to cholera. I have seen the man of regular, temperate, even abstemious, habits of life, knocked over with cholera quite as often as the intemperate. But I consider as a rule, the temperate man when attacked, has a better chance of recovery than the intemperate, as the constitution of the latter is generally more or less impaired and therefore worse fitted to withstand the shock of so serious a disease.

The statistical table given by Inspector-General Beatson, C. B., in his valuable report on cholera in Bengal in 1867, I think proves what I have just said, namely, that the mortality amongst intemperate men attacked, exceeded the mortality amongst the temperate. In this table we find that the " Ratio per cent. of temperate died to attacked, was 65·05," whilst that of intemperate was "83·72."

Without questioning for a moment the accuracy of the above statistics, as I have not the least doubt they are founded on most reliable data, yet I cannot forbear to offer a remark on the frequent fallaciousness of the terms " temperate" and " intemperate" as used in the army. A man frequently bears the Regimental character of "temperate" while his Medical History sheet shows admissions from Delirium Tremens, Ebriositas, and Dyspepsia; and he is perhaps finally invalided on account of his constitution being destroyed by intemperance. He has in fact, been a soaker for years, but has never once been found drunk. Again, many a man, who, in the Regimental records is returned as " intemperate" has never perhaps been in Hospital from any disease resulting from excess, but is an individual, who, after long periods of sobriety goes in for a bout of drinking, and as a matter of course, is found out and punished.

Influence of the element of number.

14. I believe that the influence of aggregations of persons both as regards :—

(*a*) Actual numbers.

(*b*) Crowding on a given area on susceptibility to cholera can in numerous instances be statistically proved.

Communicability of Cholera.

15. Many facts are recorded by reliable authorities which go to prove that cholera is occasionally communicated directly, or indirectly from person to person.

Sources of Evidence.

Evidence from observations of Epidemic Cholera.

21. In my report, I have endeavoured to trace the origin of the outbreak of epidemic cholera in the Wing, 76th Regiment, at Thayetmyoo, in May 1869, to communication with the Cooly village, in which the disease first appeared in the month of April, from the fact that most of the native followers daily employed in the barracks resided in the village and that one of them, a toty, died of cholera on 24th April.

At the same time I have shown that there was constant daily communication between the Cooly village and the Artillery Horse-keepers' lines, and furthermore, that some of the native followers attached to A. Battery, 23rd Brigade, R. A., and employed daily in the Artillery Barracks, actually resided in the Cooly village at the time, and that thus the Horse-keepers and the Artillery must have been exposed to the same risk of cholera by communication, as the 76th; yet from first to last not a single case occurred either among the men, women, and children of the Battery, or among the native Horse-keepers and their families.

With regard to the outbreak in the native town of Thayetmyoo, and the existence of the disease in the country round, I have in the report alluded to, given all the information I have been able to procure, and I regret it is so imperfect. The outbreak in the town would appear to be closely associated with the arrival of the man from Prome on the 6th August, and his death by cholera on the same night. Whether the disease existed in the town prior to that case or not, I cannot say. The Civil authorities think it did not.

One therefore might at first sight be justified in saying that the disease was introduced into the town by the man from Prome; but considering the constant daily communication which must have taken place between the town and the barracks, and the frequent arrivals of natives from other infected places in the district, besides Prome, and whose movements were never recorded and are consequently unknown, I think it is impossible to make any confident assertion as to how the disease was imported. The case from Prome is a remarkable coincidence, but I think nothing more; the point however is open to question.

On the subject of communicability of cholera from person to person, I would make the following observations:—

1. In the Proceedings of the "International Sanitary Conference" from pages 77 to 78, some important evidence on this subject is given.

2. In my report on the epidemic of cholera in 76th Regiment I have particularly drawn attention to the case of the child McAlister, and also to the Ayah who attended on Mrs. Comerford. The circumstances connected with those cases lead me to consider that in each instance the disease was contracted by direct communication.

3. A few years ago during an epidemic of cholera in Bengal, I met with an instance of what I believe to have been the direct communication of cholera from a patient to his Medical attendant. The circumstances were the following, and I can vouch for the accuracy of the facts:—

On a Saturday night a Medical Officer had occasion to visit a cholera ward accompanied by three brother Officers and an Apothecary. He found one man in a very low state and ascertaining that no urine had been passed for some hours, at once introduced a catheter; about 6 or 8 ozs. of fluid were drawn off of a turbid rice-water character, exactly similar to the discharges coming from the bowels and very offensive. The odour was so horrible that the medical officers looking on said they felt inclined to vomit. The operator at the time remarked that he had got such a whiff that he thought he had regularly inhaled it. Next day Sunday, he felt unwell, suffered in fact from malaise, but did not lay up, as there was too much work to be done. On the Monday morning early severe diarrhœa came on, and at 11 A. M., rice-water stools, cramps and other symptoms of cholera. He eventually recovered. It is possible that the officer in question may have been more susceptible to the epidemic influence at that particular time, as he was fatigued both bodily and mentally from the trying nature of his duties; but nevertheless, I look upon the case as one of direct communication.

One of the other Medical Officers who was present on the occasion just referred to, suffered for 3 or 4 days afterwards from marked malaise, but nothing more. He attributed his symptoms to the same cause which in the case of his friend induced an attack of cholera.

It is strange however, to reflect how many Medical Officers and Subordinates, not to mention native servants, go through repeated epidemics of cholera with all the attendant fatigue and exposure, without suffering from the disease at all.

Means of communication to be described.

31. The movements of the population in this part of Burmah are effected chiefly by walking and by river steamers and native boats.

Inquiry into causes why epidemics cease.

To questions 51, 52, and 53 I cannot at present reply.

54. I have reason to believe that the disease is mitigated by improved diet and regimen among troops and prisoners, when those items have been defective.

55. Although cholera will and does attack places which to all appearances are free from sanitary defects, yet, I think it could be shown by reference to records of epidemics at

different stations, that places where sanitation had been neglected in all material points, as a rule, suffer more than those which are better regulated.

Again, I believe it could be proved that Cities or Cantonments once notoriously insanitary, but after a time greatly improved by proper drainage, good conservancy, and pure water-supply, have suffered much less during subsequent visitations of cholera than they did prior to the sanitary improvements being effected.

56. The good results of removing troops and families from infected barracks and encamping them on clean ground in healthy localities were apparent in the case of the 76th Regiment at Thayetmyoo in 1869, and have been frequently, I may say of late almost yearly, witnessed in different parts of India.

In section IV. will be found an Analysis by the Chemical Examiner, Madras, of the water of the well near 76th Canteen, Thayetmyoo, referred to in the body of the Report.

Section IV.

Results of Analysis of drinking water received from Inspector-General, British Medical Service.

Well near Canteen, Thayetmyoo.

Sensible Properties.

Appearance	Clear.
Taste	Agreeable.
Odour	None.

Chemical Properties.

To test paper reaction	Alkaline.	
Solid matter in one imperial gallon.	Organic or other volatile matter...	4
	Inorganic, salts, &c.	50
	Total grs...	54
Oxydizable matter by permanganate solution. Relation of oxygen to organic matter 1 to 8.	... 3,360	
Hardness to soap test 1 = ·727 of grains corbonate of lime and ·989 of sulphate of lime.	Temporary	17·5
	Permanent	2·5
	Total...	20°·0
Chlorides determined volumetrically as chloride of sodium in one gallon.	... 6·547	
Carbonate of lime	Much above average.	
Do. of magnesia	Above average.	
Iron	None.	
In solution after boiling:—		
Lime	Scarcely any.	
Magnesia...	None.	
Chlorides...	Not excessive.	
Sulphates	Above average.	
Nitrates	Present.	
Ammonia	None.	
Nitrites	Do.	

REMARKS.

This is a very hard water, but does not appear to be otherwise objectionable. The presence of nitrates seems to show some slight sewage contamination, but the nitrogen has probably been completely oxidized and I do not consider the water unfit for use.

Chemistry does not profess to detect "cholera germs."

Section V.

In Section V. is a Map of the Cantonment of Thayetmyoo, showing the situation of the "Cooly Village," where the first outbreak of cholera occurred in April 1869, and also the relative positions of the various buildings occupied by 76th Regiment in which the disease appeared during the year.

The following letters on the Map indicate the localities.

A. Cooly Lines or Village.

B. Shye Bustee.

C. Nullah—Dry except in monsoon.

D. No. 10 Family Barrack, where cholera first appeared in 76th Regiment on 9th May 1869.

E. Detached Bungalow in which child McAlister was attacked on 11th May 1869.

F. No. 11 Family Barrack, where cases occurred on 11th May 1869.

G. No. 12 Family Barrack in which Private Arthur was attacked on 29th May 1869.

H. Space of ground in Redoubt where Families 76th were first encamped.

I. Brigade Ground where second and subsequent camps, including preliminary camp, were pitched.

K. Barrack used as 76th Hospital in which cholera appeared on 30th July 1869.

L. Ground on which tents were pitched for treatment of cholera cases.

M. Barrack occupied by sick when Hospital was evacuated on 5th August.

N. Band Barrack whence Private Springett was admitted.

O. No. 8 Company Barrack whence Private Allum was admitted.

P. Road to Native Town of Thayetmyoo.

Q. Staff Serjeants' Quarters, 76th Regiment, where cholera appeared on 2nd September 1869.

(Signed) W. A. THOMSON, M.B.,
Surgeon, 76th Regt.

(True Copies.)

W. R. CORNISH, F.R.C.S., Surgeon,
Sanitary Commissioner for Madras.